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UNIVERSAL WIND TUNNEL DATA ACQUISITION AND REDUCTION SOFTWARE

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Approved for public release; distribution is unlimited

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This technical report has been reviewed and is approved for publication.

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A software system was designed to support the data acquisition and reduction requirements of six wind tunnels (three continuous flow and three blow down) and a force/pressure laboratory. In order to make it easier for users to identify and select the command options available, a drop down menu was developed for use as the primary interface between the operator and the software. This drop down menu was developed before window terminals were available, and thus it works on VT100 type terminals. Because some operations/procedures are reoccurring during a specific test and include a series of menu commands, a macro feature was include as a user maintainable function in order to reduce a set of commands/operations to a single keystroke. The facility hardware configuration and data output formats are coded into the system by editing text files, no compilation or linking is required.

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TABLE of CONTENTS

LIST OF EXAMPLE OUTPUTS iv

1.0 PURPOSE 1

2.0 ENVIRONMENT 1

3.0 FILE NAME CONVENTIONS 2

4.0 PROGRAM ORGANIZATION 2

5.0 PROGRAM MODIFICATION 3

6.0 SETTING UP FOR A TEST 4

7.0 DATA PRINTING 6

8.0 DATA PLOTTING 8

9.0 DATA OUTPUT TO DISK FILES 11

10.0 REAL TIME DISPLAY 12

11.0 DATA ACQUISITION HARDWARE SUPPORTED 12

12.0 DATA ACQUISITION MODES 17

13.0 OPERATING THE PROGRAM 21

14.0 USING THE DROP DOWN MENU INTERFACE 22

15.0 DAILY OPERATIONS 23

16.0 DATA FILES USED BY THE SYSTEM 25

17.0 APPENDICES INCLUDED 26

APPENDIX A: NONPROGRAM FILES 27
APPENDIX B: EXAMPLES OF FILES 41
APPENDIX C: DATA STRUCTURES USED 67
APPENDIX D: SAMPLE DATA OUTPUTS 94

LIST of EXAMPLE OUTPUTS

PAGE FORMAT, ONE PAGE PER TEST POINT 97

PAGE FORMAT, THREE PAGES PER TEST POINT 98-100

PAGE FORMAT, SIX PAGES PER TEST POINT 101-106

HORIZONTAL FORMAT, ONE PAGE BY THREE PAGES 107-109

HORIZONTAL FORMAT, FOUR PAGES BY ONE PAGE 110-113

VERTICAL FORMAT, TWO PAGES BY ONE PAGE 114-115

VERTICAL FORMAT, ONE PAGE BY THREE PAGES 116-118

WHOLE PAGE PLOT FORMAT, SINGLE CURVE 119

WHOLE PAGE PLOT FORMAT, MULTI-CURVE 120

TRI-COORDINATE FORMAT, SINGLE CURVE 121

TRI-COORDINATE FORMAT, MULTI-CURVE 122

QUAD-COORDINATE FORMAT, MULTI-CURVE 123

1.0 PURPOSE

This software system was designed to support the data acquisition and reduction requirements of six wind tunnels (three continuous flow and three blow down) and a force/pressure laboratory. In order to make it easier for users to identify and select the command options available, a drop down menu was developed for use as the primary interface between the operator and the software. Because some operations/procedures are reoccurring and include a series of menu commands, a macro feature was included as a user maintainable function in order to reduce a set of commands/operations to a single keystroke.

2.0 ENVIRONMENT

The programs described here-in run on a MICRO-VAX under VMS 4.6 and were written in VAX FORTRAN. Data are acquired from two sources, a Pressure Systems Inc. (PSI) pressure system and a Hewlett Packard HP3852 data acquisition and control system. Each are connected to the VAX via an IEEE-488 bus.

3.0 FILE NAME CONVENTIONS

File names are divided into two parts. The part left of the period, such as the xxx in file name xxx.yy is considered the family name and the yy is the file type descriptor. As a example, for file data.for "data" is the family name and "for" is the file type. The entire family of files for the family "data" could be: data.for, data.com, data.obj, data.exe, data.menu, data.txt and data.dat. The most common file name descriptors are: **for** - a FORTRAN source file, **obj** - an object file created by a compiler, **exe** - a executable file created by the linker, **menu** - a text menu file defining the words to use in a drop down menu, **txt** - a text file, **dat** - a file containing data in text format, **bin** - a file containing data in a binary format, **com** - a VMS DCL command file, and **olb** - a library of object files. Thus in the text that follows only the family name of the file may be used and the user is expected to know the file type descriptor(s) from the context of the sentence.

4.0 PROGRAM ORGANIZATION

The main program is named "data_sys", and shall be invoked via the command file "data". This command file sets up the necessary environment before running the program. Program "data_sys" first initializes the necessary variables, files and main menus. Subroutine "data_sys_spec_int" is then called to initialize variables, files and menus that are test and facility dependent. A control loop is then entered in "data_sys" that contains a long 'if then, else if' construct that implements all of the main menu functions. This construct is extended by

subroutine "data_sys_spec_fcn" for test and facility dependent menu functions and by subroutine "plt_fcn" (in file "plot_util_subs") for the plot definition menu functions and for plot functions. It is further extended by "plt_fcn" for axis definition functions. There is one block of code in this construct for each item in the drop down menu. Each block of code in this construct consists of variable assignments, subroutine calls, etc.

The source code of all files is available via electronic/magnetic media upon request by an authorized organization.

5.0 PROGRAM MODIFICATION

New general purpose or special purpose functions can be added by inserting 'else if (condition)' and the appropriate block of code in the control loop of program "data_sys" or in subroutine "data_sys_spec_fcn" respectively. Plot functions would be added to subroutine "plt_fcn" in file "plot_util_subs". Modifications that are not facility or test dependent should be made in "data_sys". Modifications that are facility or test dependent should be made in "data_sys_spec_fcn". The text of the new menu item is then added to the respective menu definition file "data_sys.menu", "data_sys.menu_plot", or "data_sys.menu_axis".

New initializations can be added to program "data_sys" or subroutines in file "data_acqu_subs" if they are not facility or test dependent. Modifications of initializations that are facility or test dependent should be made in "data_sys_spec_init".

6.0 SETTING UP FOR A TEST

Certain information is required by the program for each test. The program reads this information from data files that define facility and test peculiarities. The function of these files is briefly defined below. More information can be found in appendices A and B.

A) File "para_descript.txt" - correlates three important items for data acquisition and reduction: 1) channel number and device the parameter is logically connected to, 2) name and units of parameter being measured or calculated, and 3) when page style printout is being used, where on the printed page to display the item's name, units and value. This file also contains information about the format to use when printing the data and about which items are to be plotted and/or displayed.

B) File "const_hardware.dat" - defines facility hardware to be used for the test, scan lists, sample rates, types of data acquisition, number of samples, etc. Before running data_sys make sure that the scan lists, number of scanivalves, number of steps, number of manual set data, balance channel, and number of digital channels is correct so that files 'raw_data.bin', 'zero_last.bin', and 'cir_que_raw.bin' are created with the correct record size. If any of these are changed, then the files must be deleted so that data_sys will recreate them with the correct record size. Failure to do so may result in some data not being stored.

C) File "const_gen.bin" - contains coefficients, gains, reference information, balance constants, channel limits, etc.

D) File "manual_preset.bin" - stores the most recent values of manually entered data.

E) File "op_display.dat" - contains information defining which parameters will be displayed on each of up to 10 logical display screens. Any one of the 10 logical screens can be

selected in real time to be output to the physical screen.

F) File "data_sys.menu" contains information defining the main drop down menu to be displayed.

G) File "data_sys.menu_plot" contains information defining a secondary drop down menu used during plotting functions.

H) File "data_sys.menu_axis" contains information defining a secondary drop down menu that is used to define plot layout attributes.

I) File "data_status.dat" contains information necessary to restart program "data_sys" from its last used state (test point number (TPN) and constant set).

J) File "table_descript.txt" defines the labels and items to be printed in table style (horizontal or vertical style).

Performing the following steps will result in a basic system that is ready to run. This process assumes that the user has a working knowledge of VAX VMS. The steps are :

1) Create a new directory to use for the new test.

2) Move a copy of file "copy_seed_files.com" from the most current directory into the new directory and use it to copy files from an old test similar to those that will be required by the new test. Then modify the files in the new directory as needed.

3) Make a list of HP3852 channels to be used, and connect them.

4) Make a list of PSI ESP modules and ports to use.

5) Make a list of scanivalves and steps to use.

6) Modify as needed file "const_hardware.dat" to reflect known information about the test.

7) Run utility ed_const, create/modify and preset constant file "const_gen.bin".

8) Enter transducer constants (manually with program "ed_const" or via program "calibrate") and balance constants (copied via program "ed_const") if used, into file "const_gen.bin".

9) Modify as needed print description file "para_descript.txt"

10) Modify as needed table description file "table_descript.txt"

11) Modify "aero_reduc.for" to suit current test.

12) Modify "data_sys.menu" to suit current test.

13) Modify "data_sys_spec_init.for" to suit current test.

14) Modify "data_sys_spec_fcn.for" to suit current test.

15) Modify "spec_plt_cal.for" to suit current test (not modified frequently).

16) Re-compile and link data_sys using file data_sys.com .

17) Modify file "op_display.dat" to define the parameters to display, and their location on the screen.

18) Execute program (via @data) and check out the system.

19) Modify the plotting definitions using the secondary drop down menu axis.

7.0 DATA PRINTING

There are three standard styles that the data can be printed in:

1) Page style has one or more sheets (up to 7 pages per test point) with parameter names, units and values laid out in a block with the three respective items one above the other. The blocks are then arranged on the page up to eight across with headings inserted between horizontal lines. See the example in appendix D, pp 97-106.

2) A horizontal table style that has parameters on the first line following the heading and units on the second line going across the page from left to right (maximum of 8 parameters per page, 20 pages wide), and test points going down the page (maximum of 61 per page, no limit on the number of pages down). There can be up to 14 labels per page; 10 the same on all pages, and 4 unique per page. See the example in appendix D, pp 107-113.

3) A vertical table style that has parameters (column one) and units (column two) going down the page in landscape mode (maximum of 45 parameters per page, 20 pages down), and test points across the page going left to right (maximum of 10 per page, no limit on number of pages wide). There can be up to 14 labels per page; 10 the same on all pages, and 4 unique per page. See the example in appendix D, pp 114-118.

The file "para_descript.txt" (example on pp 58-61) defines for each data item the logical connection between: 1) parameter name, 2) parameter units, 3) the logical device it came from, 4) the channel number of that device, and 5) the format to use when printing the value out. File "para_descript.txt" also defines the following when printing in page style: 1) labels and where to print them, and 2) where on the page parameter grid, the name, units and value of the parameter will be printed. File "table_descript.txt" (example page 66) defines, for both the horizontal and vertical table styles, the labels and where to print them, and which parameters (a subset of those in "para_descript.txt") are to be printed and where on the table they will be printed. For horizontal tables, the column each parameter is to be printed on is defined. For vertical tables, the row each parameter is to be printed on is defined.

The output device and the output style is selected from the main menu. The possible output devices are: 1) local LN03 printer, 2) remote LN03 printer, 3) user's screen, and 4)

disk file. The possible output styles are: 1) page style, 2) horizontal table, and 3) vertical table.

8.0 DATA PLOTTING

Program "data_sys" will also plot data from a set of test points numbers that have just been reduced (during acquisition or recall) since the last "reset plot" command. There are two files required to describe plots.

1) File para_descript.txt: field one of non-comment records (comment records have a "*" in column two) is T (true) for items to be accessible for displaying/plotting or F (false) for items that will not be displayed/plotted.

2) File plt_*.axis (where "*" ranges from 1 to 99), describes:

a) scale limits

b) grid spacing

c) the number of axis per page

d) the number of curves per axis

e) the number of points per curve

f) the items (by name) to be used as the x and y coordinates of the data to be plotted for each curve on the axis

g) the labels of the axis

h) the graph label

i) the item (by name) whose value is to be put in an annotation

j) the FTN77 format (i.e. F8.3) the value of the item is to be printed in

k) the name of the item specified in i) can be included as a literal in its format statement specified in j) if the name is to be printed

l) the row and column of each annotation.

Each annotation can optionally be prefixed by a symbol of one of the curves in order to link it logically to one of the curves. See examples of each of these files in appendix B.

The annotations defined are placed at the top of the page between the title and the graphs. There are three columns and up to eight rows of annotations of 28 characters each. The contents of each annotation is limited to the value from two variables, and literals from the format statement. See appendix D, pp 119-123 for examples of plots with annotations.

The following is a description of the annotation part of file plt_*.axis and will only be needed by experienced users because this file is not normally accessed directly by general users because all necessary changes can be made via drop down menu functions. Each annotation definition consists of two lines. The first line has four entries. Fields one and three are character, and have the name of the item whose value is to be printed. Fields two and four are integer, and select the relative TPN the values are to be selected from with the following exceptions. If field two equals -1, then print the comment of the first TPN of the data set being plotting. If field two equals -2, then print the date/time the first TPN of the data set being plotted was acquired at. If field two equals -3, then print the current date/time. If field two and four equal 0, then print literals only as specified by the format of the next line. If field four equals a number between one and the last relative TPN number, then print the value from that relative TPN as the second value for the annotation being described. Each annotation can use

28 columns on the plotted page. The date/time item uses 20 of the 28. If field four equals 9999, then print the value of the last TPN of the set as the second value for the annotation being described.

All the data needed to generate a plot are placed into the structure "plt" by subroutines of the system. Then subroutine aero_plot is called and it picks the needed data from the structure plt and passes it to the routines of the plotting library (DISSPLA version 10.5) to generate the specified plot. See file plot_util_subs.for_struct in appendix C, pp 85-87, for a definition of the meaning of the fields in structure plt.

There are other factors of plotting via "data_sys" that should be noted. The method used to recall the data affects how the data are grouped on the defined curves. This adds a lot of flexibility in plotting multiple curves on one axis. The "Plot reset" command (from the drop down menu) should be used before recalling the first data set of a new plot in order to purge the plot data buffer of old data. The data are plotted in the same order the TPNs are specified in the TPN list for the recall command (thus TPNs can be plotted in random order). (Note: a set of TPNs consists of all the data recalled from a complete TPN list for a single recall command. If multiple data sets are recalled without using "plot reset" in between the recall commands, the resulting plot will be a composite of the first data set being overlaid by the plots of each succeeding data set.)

1) Recall all TPNs with one TPN list in one recall command if :

   A) plt_*.axis has multiple X-Y pairs per curve and/or

   B) plt_*.axis has a single X-Y pair, and one curve is wanted for the set of TPNs recalled.

2) Recall TPN's in sets using multiple recall commands if :

A) plt_*.axis has a single X-Y pair and one curve is wanted for each set of the multiple sets of TPNs.

9.0 DATA OUTPUT TO DISK FILES

Any of the printed data styles discussed previously can be output to a disk file in ASCII. The files created will be exact replicas of the printed page and could be read/parsed by an independent program and/or transferred to another computer. There are two other methods for outputting the data to disk that lend themselves better to being read/parsed by another program.

The first format is generated with menu item "save calculated" enabled. This format is a replica of the page style minus the lines containing labels, names, and units.

The second format is the "ADAM" format, it may be selected under the "toggle" menu bar. This format is preceded by a logical record that contains all of the names of the data items in the order and position they appear on the printed page style. After the name logical record, one logical data record follows for each test point. The first line of each record is the date line, and the second line is the data comment line. The first two characters of the first two lines of each record are "!*" and the last two characters are "*!". These two lines serve as markers for the beginning of logical records and provide useful data as well.

10.0 REAL TIME DISPLAY

Up to 10 logical display screens can be defined in file "op_display.dat". While in the display loop any 1 of the 10 screens can be selected by pressing digits 0 through 9. Each screen can have up to two columns of up to seven parameters per column. The parameter values, their label, the screen, the column, and the row they are to be displayed on is defined in the file "op_display.dat". If the facility error flag is true, the display is automatically set to screen 9 (the tenth screen) until the error is corrected, it then reverts to the previously selected screen. While in the display loop, if "save circular queue" flag is true, all raw data acquired for the display is stored in a circular queue (emulates an endless loop tape about 30 minutes long). The data in the circular queue can be useful if something unusual was to happen while test data were not being taken and thus nothing would have been recorded. In order to make the display update time as fast as possible, only HS (high speed, 100 kHz Analog-to-Digital Converter (A/D)) data are read by default for the operator display. If the PSI or scanivalve systems are required, their respective flags must be set. The standard menu has a function that will set these flags. Look under the "toggle" menu for items "PSI on" and "SV on".

11.0 DATA ACQUISITION HARDWARE SUPPORTED

This software acquires data from Pressure System Incorporated (PSI) Model 780 or PSI Model 8400 and Hewlett Packard (HP) data acquisition and control system Model 3852. The PSI 780 and 8400 are systems that electronically scan pressure modules and provide pressure

readings in units of psi. The PSI 8400 also supports some analog channels. The HP 3852 has one high speed A/D, one high resolution A/D, several analog multiplexer cards, digital output cards, digital input cards and counter cards. The HP 3852 is used primarily to digitize voltages from analog transducers and to control digital I/O for other devices and transducers.

The following is a description of the hardware components this data acquisition software supports. In general, this combined hardware/software system is used to acquire, process, and record aerodynamic data generated in various types of wind tunnels. Their Mach numbers, Reynolds numbers, temperatures, and run times vary widely. In general, static data (dc to 20 Hz) that have been transformed to volts by one of many types of transducers are digitized by one of three devices: a high speed voltmeter, a high resolution voltmeter, or a PSI 8400 or 780 pressure system. There are also a few measurements made by devices that return a multibyte digital value. The actual device used to make each measurement depends on the type of data that are being acquired. The high speed voltmeter is used for data whose full scale voltage range is from +30 mV to +10 V or -10 V to -30 mV, requires a resolution of 0.02% or less, and requires a sample rate of 100 kHz or less. The high resolution voltmeter is used for data when the full scale voltage range is +8 mV to +30 mV or -30 mV to -8 mV, requires a resolution of 0.02%, and requires a sample rate of 415 Hz or less. The PSI system handles all pressure scanning devices in the range of +/-5 psid to +/-100 psid. A TTL input card is used to acquire the digital data.

The primary (varies slightly from wind tunnel to wind tunnel) hardware components of each data acquisition system and their general specifications are:

3500 Micro VAX, which includes;

16 MByte RAM

450 MByte Hard Disk (dub0:)

1500 MByte Hard Disk (dub1:)

1600/6250 BPI half inch by 9-inch-diameter tape

TK50 cartridge tape

Ethernet I/O

12 variable Baud rate serial I/O ports

2 IEEE-488 I/O bus controller ports

LN03 printer/plotter

multiple terminals

HP 3852S Data Acquisition System with IEEE-488 interface

120 channel high speed differential multiplexer

20 channel high resolution 3-wire multiplexer

100kHz 13 bit A/D, auto range 40 mV to 10.24 volt

400 Hz 16 bit A/D, auto range 30 mV to 300 volt

32 TTL inputs

32 TTL outputs

4 channel D/A output

5 channel counter, 200 kHz

8400 or 780 PSI System with IEEE-488 interface

seven 64 port 5 psid ESP modules

one 32 port 30 psid ESP module

one 64 port 100 psid ESP module

one 30 channel analog input

5 psid calibration standard

30 psia calibration standard

100 psia calibration standard

The system software pulls all the hardware components together into a cohesive and integrated system. The following is a brief summary of the software components that control the hardware listed above.

Main program - coordinates all activities and functions through the user interface (a drop down menu). The following is a list of the major high level commands that are implemented by the respective hardware and are available through the system drop down menu of the main program:

Take analog zeros

Take force and moment balance tares

Calibrate PSI system

Calibrate HS A/D

Output data to operator display

Acquire data at specified rate

Acquire one test point from all hardware

Acquire one test point from selected hardware

Acquire one test point from PSI system only

Manually reset Run number

Manually reset TPN

Manually enter test configuration code

Manually enter a comment

Manually enter model parameters

Recall and recalculate previously recorded data

Print recorded raw data

Change print device

Select print style

Select pages to print

Select plot options

Select device to plot to

Make and execute macros

Control data - Data files that can be edited by standard text editors. These files specify information about hardware configurations so that the software has current information as to where and what hardware is to be used for a specific test. These files also specify the style to be used to print and plot the data without the need to compile or link any programs.

Facility and test dependent subroutines - subroutines that handle facility and test peculiar functions.

Library - contains the subroutines and functions that do all the low level work.

Other subroutines - as needed to support the facilities.

Data Structures - method used throughout the programs and subroutines to logically group large quantities of related data items of various data types.

Support programs - programs for calibrating, editing the binary constant file, testing hardware, etc.

12.0 DATA ACQUISITION MODES

The PSI 780 and 8400 are used primarily to acquire pressure data that they have prereduced to units of psi. The PSI 8400 also has analog inputs that are primarily used for reading thermocouples. The analog section of the HP 3852 is used to acquire relatively high speed (HS) analog data, burst data, RMS data, scanivalve data, and high resolution (HR) analog data. The HP 3852 is also used to acquire digital data and to output digital control commands to other devices.

The HS data mode provides a single averaged reading from each analog channel in the channel list. HS data are acquired using the following variables :

1) Channel list, may be in random order.

2) Number of times to sample each channel before averaging. Note, the number of channels multiplied by the number of steps multiplied by samples must be less than the buffer size in the VAX.

3) Time between samples (greater than or equal to 0.000010 second). Note, after 4096 samples have been acquired, there is a pause in the data acquisition while the data are transferred to the VAX. The data acquisition is then continued until another 4096 samples have been taken or the last sample has been acquired. This is repeated until all data have been acquired. The combined maximum throughput to the VAX is 35,000 samples per second.

The burst data mode provides a single averaged reading for each channel in the channel

list for each set of data taken. The burst mode takes data at a maximum rate of 70 kHz, but is limited to smaller total number of samples. Burst mode takes a finite number of data sets (TPNs) when invoked and may be synchronized to an external trigger. Burst data are acquired using the following variables:

1) The burst mode channel list shall be a subset of the HS channel list.

2) Number of times to sample each channel per data set before averaging.

3) Time between samples (greater than or equal to 0.000010 second) per data set. Note: the total number of samples per data set is equal to the number of channels multiplied by the number of samples per channel and must be less than 4096. Then the data set is transferred to the HP 3852 memory.

4) Number of data sets to take. Note, the number of samples multiplied by the number of channels multiplied by the number of data sets must be less than the buffer size setup in the HP 3852.

5) Time between sets. Minimum time depends on time between samples, number of channels, and number of samples per channel. The burst mode has a throughput of up to 70,000 samples per second (depending on time between samples and the time between sets).

6) Source of initial trigger to start burst data acquisition. The choices are external (physically provided by the user) or internal from the HP 3852.

The RMS data mode provides rms readings for each channel in the channel list. The RMS data are acquired using the following variables :

1) The RMS mode channel list shall be a subset of the HS channel list.

2) Number of times to sample each channel before calculating the RMS value. Note, the

number of channels multiplied by the number of samples must be less than the buffer size in the VAX.

3) Time between samples (greater than or equal to 0.000010 second). Note, after 4096 samples have been acquired, there is a pause in the data acquisition while the data are transferred to the VAX. The data acquisition is then continued until another 4096 samples have been taken or the last sample has been acquired. This is repeated until all data have been acquired. The combined maximum throughput to the VAX is 35,000 samples per second (depending on time between samples).

The Scanivalve data are acquired using the following variables :

1) The scanivalve channel number shall be a subset of the HS channel list. Note: unlike the other channel lists, this list must be discrete channels. Channel ranges are not allowed.

2) Number of times to sample each channel of each scanivalve step before averaging. Note, the number of channels multiplied by the number of steps multiplied by times the number of samples must be less than the buffer size in the VAX.

3) Time between samples (greater than or equal to 0.000010 second). Note, after all the data for a step of the Scanivalve or 4096 samples have been acquired, there is a pause in the data acquisition while the data are transferred to the VAX. The data acquisition is then continued until another 4096 samples have been taken or the data for another step have been taken. This is repeated until all data have been acquired. The combined maximum throughput to the VAX is 35,000 samples per second (depending on time between samples).

4) The number of times to step the scanivalves. Note: data are taken at home port as well as the number of steps specified.

5) The maximum delay between steps in seconds. Thus, if the data do not settle out to within the specified tolerance, data will be taken after this maximum time has been reached.

6) The delay between scanivalve tolerance checks in seconds. This parameter determines the frequency that the scanivalve data are taken and compared with the previously taken data.

7) Tolerance data are to settle within for each channel. This value is expressed in the ratio of full scale to the delta between the last two readings.

The HR data mode provides a single integrated reading from each analog channel in the HR channel list. HR data are acquired using the following variables:

1) Channel list, may be in random order.

2) Number of power line cycles to integrate data over.

The PSI 780 system acquires pressure data from pressure modules. The following variables are used to set up this system.

1) Channels per module for each calibration range.

2) Time between pressure calibration points.

The PSI 8400 system acquires pressure and low speed analog data. The following variables are used to set up this system.

1) The five calibration pressures for each of three calibration ranges and whether they are differential or absolute.

2) A list of pressure module addresses for each calibration range.

3) Number of pressure channels for each module.

4) Time between pressure calibration points.

5) Number of readings to average per data point.

6) Voltage input range of each analog input unit.

13.0 OPERATING THE PROGRAM

The program is invoked by typing "@data<return>", and thus executing the command file "DATA.COM" This command sets up the I/O assignments required and runs the correct version of program "DATA_SYS". The program first initializes files, variables and some hardware; it then executes macro "J" from the macro list which does any necessary facility or test peculiar configuration or initializations. After the program menu appears on the terminal screen, the user navigates through the drop down menu using the arrow keys. When the function to be performed is highlighted, press the return key in order to execute it. Macros are created by entering the learn mode (select "Begin Learn" under the "Macro" menu) and then navigating through the menus and selecting the needed functions as if performing the required task. After the last menu item for the macro that is being made has been selected, select "End Learn" under the "Macro" menu in order to terminate the learn mode. A macro can be executed either of two ways: select "Execute" from the "Macro" menu, or press a defined macro key (A through J) any time not being prompted for an input.

The system also has a data display function that repeatedly goes out and reads all data and displays the data specified by file "op_display.dat" on a video screen. While in the display loop, the operator has the following options: 1) Press numbers 0 through 9 to select different display screens. 2) Press letters "a" through "j" to select a defined macro. 3) Press "o" to start the

burst mode data acquisition. Burst mode stops after the number of scans specified in file "const_hardware.dat" have been recorded. 4) Press any other key to exit the display loop.

14.0 USING THE DROP DOWN MENU INTERFACE

After the program has been invoked via command @data, the drop down menu interface will become active. The top line of the screen will always contain the current menu bar (horizontal list of function categories), an example is on the following line :

Files Axis Label Curve Points Annotation Miscellaneous

Under one of the function categories in the menu bar, there will be a vertical list of menu items (functions) the user can select. By using the right and left arrow keys, the user can select any one of the function categories in the menu bar. As new function categories in the menu bar are selected, a new vertical list of functions under the newly selected function categories appears and the last list disappears. For example, if the user had pressed the right arrow key three times, he/she would have selected the Curve function category from the menu bar and the upper half of the screen would look like the next nine lines :

Files Axis Label Curve Points Annotation Miscellaneous
current file id: 20
current axis: A
current curve: 1
no curves: 2
use data set: ALL
line: T
symbol: T
start sym: 1

On the actual screen the line with "current file id: 20" would be shown in inverse video instead of being in italic. Once the user has selected the appropriate function category from the menu bar, he may select different functions by using the up and down arrow keys. After the specific function has been selected, the user presses the "Return" key to execute that function. If the down arrow had been pressed three times and the "Return" key pressed, the "no curves" function would have been executed and the upper half of the screen would look like the next nine lines:

Files Axis Label Curve Points Annotation Miscellaneous
current file id: 20
current axis: A
current curve: 1
no curves: 2
use data set: ALL
line: T
symbol: T
start sym: 1

The drop down menu uses the upper half of the screen and a scrollable output window is in the lower half of the screen. This output window can be scrolled down by pressing the left "<" key, and scrolled up by pressing the ">" key.

15.0 DAILY OPERATIONS

The following steps are representative of how to take and reduce data for a typical test that has been correctly setup:

1) Log on the facility VAX.

2) Select the directory for the respective facility and test.

3) Activate program by typing "@data" return.

4) Set all transducers using zero subtraction to standard conditions.

5) Check all manually entered data under the "Entry" menu; change any data in error or not current. The last used values remain in these locations until changed.

6) Using the "Setup" menu; take zeros, take tares, and calibrate PSI system as required.

7) Under the 'Process' menu; select "Operator display".

8) When the wind tunnel is on condition, press the appropriate macro key or begin burst data by pressing the "o" key.

9) After all data for this configuration have been taken, press the return key to exit the display loop.

10) If plotting is required and was not done while the data were being taken, then under the "Process" menu select "Reset plot".

11) If printing is required and was not done while the data were being taken, select the printer and style from the "Toggle" menu.

12) Under the "Diagnostic" menu; select "Recall" to calculate the data of the TPNs of interest and make them available for plotting and printing.

13) After the last TPN has been processed, "select plot option" is displayed on the screen.

a) If plotting is desired:

i) Under the "Process" menu of the Plot menu bar; select "Plot Generic".

ii) After "plotting done" is printed on the screen go to 7 above if more data will be taken.

b) If plotting is not required and more data will be taken, go to 7 above.

c) If you are done acquiring data, under the "Setup" menu select "Exit".

14) Type "lo" and press the return key to log off.

16.0 DATA FILES USED BY THE SYSTEM

There are two primary types of files used by the system: files that information is primarily read from, and files that information is primarily written to. The following are data files from where information is primarily read. See appendix A for details of each file and appendix B for examples.

const_gen.bin
const_hardware.dat
data_status.dat
data_sys.menu
op_display.dat
para_descript.txt
plt_*.axis
table_descript.txt

The following are data files that are primarily written to. See appendix A for details of each file and appendix B for an example of each file except those ending in "bin".

cir_que_raw.bin
data_sys.macro
manual_preset.bin
raw_data.bin
raw_data_specification.txt
save_calculated.dat
zero_last.bin

The following are other system related files. See appendix A for details of each file and appendix B for an example of each file except those ending in "exe".

copy_seed_files.com
data.com
data_sys.com
data_sys.exe

17.0 APPENDICES INCLUDED

There are four appendices that follow. Appendix A contains a brief description of each nonprogram disk file used by this system. Appendix B contains an example of each of the files described in Appendix A. Appendix C has a listing of the primary data structures used by the software. In the structures are comments that define the major variables used through out the system. Appendix D contains examples of the various types of data outputs in printed and plotted form.

APPENDIX A: NONPROGRAM FILES

This appendix contains a brief description of all the nonprogram disk files used by this system. The files are presented in alphabetical order. The files included are :

CIR_QUE_RAW.BIN	28
CONST_GEN.BIN	28
CONST_HARDWARE.DAT	31
COPY_SEED_FILES.COM	31
DATA.COM	31
DATA_STATUS.DAT	32
DATA_SYS.COM	32
DATA_SYS.EXE	32
DATA_SYS.MACRO	32
DATA_SYS.MENU	33
MANUAL_PRESET.BIN	33
OP_DISPLAY.DAT	34
PARA_DESCRIPT.TXT	34
PLT_*.AXIS	36
RAW_DATA.BIN	37
RAW_DATA_SPECIFICATION.TXT	38
SAVE_CALCULATED.DAT	38
TABLE_DESCRIPT.TXT	39
ZERO_LAST.BIN	40

CIR_QUE_RAW.BIN :

This file contains the last 2046 data sets taken while in the programs display loop. Each record (except record 2047) has the same format as file "raw_data.bin". This file is a circular queue, the current data overwrites the oldest (by time and date) in the file. Record 2047 is used to store the current pointers to the beginning and end of the queue. This file is created and maintained automatically by the system.

CONST_GEN.BIN:

Contains constants for second order curve, reference, gain, and transducer limits for each hardware channel. Created and edited by program "ed_const". Data from a calibration may also be stored in this file by the program "calibrate". The data reduction program reads information from this file.

1) In general the following constant fields exist for each channel of each input device: A0, A1, A2 (where $y = A0 + A1 * x + A2 * x^2$), Ref, Gain, Limit. The Ref field is an 8 character string. The first character is generally + or -. When +, the value calculated for the respective channel is added to the specified reference. When -, the value calculated for the respective channel is subtracted from the specified reference. Characters 2 through 8 generally specify the name of the data channel the current channel is referenced to. The exceptions are "NOZERO" (do not use zero or reference), "NOREF" (do not use reference), and "TC/K", where K is a thermocouple type. The first character can also be a < or >

which has special meaning for scanivalves. The Gain field is the physical gain of the channel and is divided into the measured voltage of the current channel before the data are stored or used. The Limit field is the maximum voltage allowed on the current channel before the operator is given an over voltage message.

2) High speed A/D, other than thermocouple or scanivalve:

A0 - intercept

A1 - slope

A2 - 2nd order

Ref - see paragraph one

gain - gain of amplifier

limit - max in range voltage for this channel

3) High speed A/D thermocouple channels:

A0 - 0 or 459.6 (def F or Def R)

A1 - 32 or 150 (junction temp. def F) used only if A2 = 0

A2 - channel no. reading ref. temp.

Ref - +TC/* (where * = E, J, K, R, S, or T type thermocouple)

gain - gain of amplifier

limit - max in range voltage for this channel

4) High speed A/D scanivalve channels:

A0 - intercept

A1 - slope

A2 - 2nd order

Ref - *"string", note: see section 1) above for a definition of the string

* = + or < add calculated value to ref

* = - or > subtract calculated value from ref

* = + or - use home port zero of current TPN

* = < or > use zero from ZTPN

gain - gain of amplifier

limit - max in range voltage for this channel

5) Pressure system (PSI):

A0 - N/A

A1 - slope

A2 - N/A

Ref - *"string", note: see section 1) above for a definition of the string

* = + or - use ref. pres. at time of psi cal. for zero

* = < or > use ref. as defined by "string"

gain - N/A

limit - N/A

6) Digital input channels:

A0 - N/A

A1 - slope

A2 - N/A

Ref - N/A

gain - N/A

limit - N/A

CONST_HARDWARE.DAT :

Contains information about the hardware configuration. See comments in example of this file in appendix B for more details. Note, there is a limit to the total number of A/D samples per test point. The arrays (voltrl and voltpk) the data are stored in must be greater than the product of the number HS channels being sampled and the quantity the number of samples per channel plus one. The size of these arrays is currently 250,000 values, thus 120 HS channels could be sampled 2082 times each.

COPY_SEED_FILES.COM

Copies the test and facility specific files needed to start up the system from a specified directory to the current directory. This is the easiest way to start a new test because it takes less time to modify old files than it does to create them enter all required data by hand.

DATA.COM

Command file containing necessary DCL commands to invoke the program"data_sys.exe" in the proper environment.

DATA_STATUS.DAT

Values of variables needed to restart the program and return it to the same status as when it was last exited. Line one contains the last TPN recorded, TPN number of the last zero recorded, number of constant set being used, the number of current constant sets available, and the current run number. Line two contains the number of HS channels being used, and the number of scanivalve channels being used. Line three contains a list of plot file identification numbers that were open when the program was last used.

DATA_SYS.COM

Compiles the test specific files and links all files needed to produce the executable file.

DATA_SYS.EXE

This is the executable file. It should not be run directly, but rather indirectly via the command file data.com.

DATA_SYS.MACRO

Contains the list of current macros defined for the system. This file is created and maintained by the system via commands in the macro menu.

DATA_SYS.MENU

Contains the information that defines the menu bar (function categories) and the menu items (functions) that will be displayed when the program is running. Items under a particular menu bar name can be rearranged in any order as long as they remain under the same menu bar name. A menu bar name can be moved anywhere in the list as long as the menu items associated with it are moved with it. Additions to the menu will not create an error, but will not perform a function if selected unless the respective code to perform the function is added to either "data_sys.for" or "data_sys_spec_fcn.for". The first field of each record is a string defining either menu bar name or a menu item name. If the first was a menu bar name, then the second field must be the string "bar" to mark it as menu bar name. If the first field is a menu item name, then the second field is a logical. Set it to "true" if the menu item is initially to be selectable, and set it to "false" if the menu item is initially not selectable. From this main menu, the secondary menus plot and axis can also be activated. They temporarily replace the main menu and their description files are "data_sys.menu_plot" and "data_sys.menu_axis" respectively. See appendix B for examples of these files.

MANUAL_PRESET.BIN

Stores parameters called manual entry data, any data entered from the keyboard. There are up to 50 such items, and their value is normally entered from the keyboard. The values that each of these parameters are given are stored in this file and used to reset the respective variables

in the program to their last value each time the program is run by reading this file.

OP_DISPLAY.DAT

Defines which items are to be displayed on the facility operators display screen. Screen 0 through 9 may be defined with up to seven items in each of two columns. Screen 0 is defined first, with the other screens following in numerical order. Screen zero starts on line one and uses as many consecutive lines as necessary to define the screen display. There is a delimiter line between screens, the first seven characters of the first field must be "*screen". Each line shall have three character fields each enclosed in single quotes. The first field is a name defined in the file "para_descript.txt", a system device, or "*screen....". The second field is the name/comment to appear on the screen to the left of the parameter value. The third field is a FORTRAN format specification.

PARA_DESCRIPT.TXT

This file is the key correlation descriptor between device channel number and a item/parameter name. It also controls where on the printed page (page style) the parameter name, units, and value are to be printed. An example of page style output is in appendix D. This file also identifies which parameters can be displayed and/or plotted. Column one shall always be blank on each line. There are four types of lines: comments lines, page and line

layout command lines, heading or label lines and item definition lines. Comment lines have a "*" in column two, followed by a comment. There are two layout commands for controlling paging and new line beginning. The beginning of a new output page is marked by entering "#page" in columns two through six. A new data output line (not the page line number) is started by entering "#line" in columns two through six. Heading or label lines and item definition lines have multiple fields. These fields shall be separated by spaces and/or tabs and their character fields shall be enclosed in single quotes. Heading or label lines have the following format:

1) Field one is logical and shall be F (false).

2) Field two is numeric and shall be 0.

3) Field three is numeric and identifies the label number. The possible values are 1 through 47. Each label has a unique number.

4) Field four is two alpha characters and shall be "LB".

5) Field five is the heading/label string.

6) Shall be a space enclosed by single quotes, "' '".

7) Shall be a space enclosed by single quotes, "' '".

Item definition lines have the following format:

1) Field one is logical and shall be "T" or " F". It shall be "T" if this item is to be displayable/plottable. It shall be "F" if this item will not to be displayable/plottable.

2) Field two is numeric and defines the data column number (not paper column) the item is to be printed on. Possible values are 1 through 8.

3) Field three is numeric and defines the channel number of the logical device to be

specified in field four.

4) Field four is two alpha characters and defines the logical device the data are to come from. The possible logical device codes are:

   a) HS - HP3852 high speed channels

   b) HR - HP3852 high resolution channels

   c) PS - PSI channels, from a sequential list of all ports from all modules

   d) SV - Scanivalve data, from a sequential list of all ports of all valves

   e) DG - HP3852 digital input channels

   f) DR - derived parameters, values calculated and not related to a physical device

   g) MS - manual set data, keyboard entry

5) Field five is character, it shall contain the item/parameter name.

6) Field six is character, it shall contain the units of the item.

7) Field seven is the format to print the value of the specified item in. This is a FORTRAN format and shall use exactly 12 columns of the printed page.

An example of this file is available in appendix B.

PLT_*.AXIS

Defines labels, axis scaling, grids, number of coordinates per page, and parameters to be plotted on each coordinate. This file also defines annotations to be printed above the axis. This file is maintained via functions named in the secondary menu "axis" defined in file

"data_sys.menu_axis". The files "plt_*.axis" where * is 1 through 99 are maintained by the system. See a example of this file in appendix B.

RAW_DATA.BIN

Stores all raw data for a single test. Each test point is stored in one recorded of this file. The fields of each record are defined as follows and in the order given. The actual length of arrays defined with a size of range1 through range5 is test dependent and may be found in the file "raw_data_specification.txt". The tare information is only stored if a balance is used. This file is created and maintained automatically by the system.

```
integer*4   tpn              ! test point number of this record
integer*4   zero_tpn         ! TPN of zero for this record
integer*4   tare_tpn         ! TPN of tare for this record
integer*2   run_no           ! run number of this record
integer*2   const_id         ! constant set for this record
integer*2   month            ! month data taken
integer*2   day              ! day data taken
integer*2   year             ! year data taken
byte        time(8)          ! time data taken
real*8      acq_str_tim      ! time start hs acquisition
real*8      acq_stp_tim      ! time stop hs acquisition
character   comment*80       ! comment for tpn
real*4      hp3852_hs(range1) ! raw hp hs data
real*4      psi(range2)      ! raw psi data
real*4      sv(range3)       ! raw hp hs sv data
integer*4   hp3852_dg(range4) ! raw digital data
real*4      man_dat(range5)  ! keyed in data
real*4      trdla            ! tare info, model up or down
real*4      trdlb            ! tare info, angle for zeros
real*4      trdlc            ! tare info
real*4      trdld            ! tare type, roll or pitch
real*4      w                ! tare, model weight
real*4      aw               ! tare, pitch moment
```

real*4 bw ! tare, roll moment

RAW_DATA_SPECIFICATION.TXT

This file stores the information used to calculate the record size of files "raw_data.bin", "zero_last.bin" and "cir_que_raw.bin". This file and the three listed in the previous sentence must be deleted as a set (the data in them will be lost). Four new files will be created automatically. This file is maintained automatically and will contain the required information. The information in this file is used after the files have been created to tell the program how to read and write to these data files. The information required to initially create the three binary files is read from file "const_hardware.dat". Once the three binary files have been created, changing "const_hardware.dat" does effect reading or writing to these three binary files because the necessary information is then obtained from "raw_data_specification.txt". See an example of this file in appendix B.

SAVE_CALCULATED.DAT

This file is a mirror image (in ASCII format) of the printed data in matrix page style minus the labels, parameter names and units. This file is created and maintained by the system. The file name used here is only the default name and may be changed by the user via a function in the drop down menu.

TABLE_DESCRIPT.TXT

This file describes labels, parameters by name and the positions that data will be printed to in either of the two table output modes. Each record has two fields. Field one is numeric and has the following values:

1) Field one = 0; string specified in field two is a label to be printed on all pages.

2) Field one < 0; string specified in field two is a label to be printed on the page number specified by the negative of field one.

3) Field one > 0; specifies the page the parameter named in field two is to be printed on.

Field two is alpha (enclosed in single quotes) and has the following meanings:

1) A literal string used as a label if field one is < 1. This string will be printed on the page above the data table.

2) The name of a parameter specified in the file "para_descript.txt". This will result in the value of the parameter specified being printed in the table with the format specified for this parameter in file "para_descript.txt".

3) The string "*DATA_COMMENT*" if the comment from the recorded data is to be printed as a label.

4) The string "*DATA_DATE*" if the date from the recorded data and the current date is to be printed as a label.

5) The string "*COMxx" (where xx is 01 through 68) if a portion of the comment is to be printed as data in the table. The portion of the comment printed begins with character xx and continues for 13 consecutive characters. The data in the output table are printed in the order it is defined in this file. When the horizontal table output option is used, data

will be printed out with parameters going from left to right and TPNs going from top to bottom. The printer will be in portrait mode. When the vertical table output option is used, data will be printed out with parameters going from top to bottom and TPNs going left to right. The printer will be in landscape mode. The number of pages required to hold these data will automatically expand as the number of TPNs and parameters increases. Examples of this type of data output can be found in appendix D.

ZERO_LAST.BIN

The current zero and tare is stored in this file. A copy is also stored in file "raw_data.bin" in the record corresponding to its TPN. Because tares are taken after the zero has been taken, both the working copy and the permanent copy must be modified when a tare is taken. File "zero_last.bin" has the same structure as file "raw_data.bin" but is only one record long. This file is created and maintained automatically by the system.

APPENDIX B: EXAMPLES OF FILES

This appendix contains an example of each nonprogram disk file used by the system in alphabetical order. The files that are binary are shown in ASCII form so the user can read them. Although the function content of the examples correctly illustrates the content of these files, some format variations (spacing compressed) were necessary so that they would fit on these pages. Each example is prefixed by the name of the file in bold capital letters. The files included in alphabetical order are:

CONST_GEN.BIN	42
CONST_HARDWARE.DAT	42
COPY_SEED_FILES.COM	45
DATA.COM	46
DATA_STATUS.DAT	50
DATA_SYS.COM	50
DATA_SYS.MACRO	51
DATA_SYS.MENU	52
DATA_SYS.MENU_AXIS	53
DATA_SYS.MENU_PLOT	55
MANUAL_PRESET.BIN	56
OP_DISPLAY.DAT	57
PARA_DESCRIPT.TXT	58
PLT_*.AXIS	62
RAW_DATA_SPECIFICATION.TXT	65
SAVE_CALCULATED.DAT	65
TABLE_DESCRIPT.TXT	66

CONST_GEN.BIN

Const Set = 1
Device Id = HS

Patch Channel	Parameter	Parameter Channel Name	A0	A1	A2	Refere	Gain	LIMIT
1	1		0.000	1.000	0.000	+NOREF	1.	12.00
2	2		0.000	1.000	0.000	+NOREF	1.	12.00
3	3	T0	459.6	32.00	0.000	+TC/K	1.	0.010
4	4	Pitch	.0196	4.020	-.0038	+NOREF	1.	5.000
9	5	ESPT1	0.000	32.00	0.000	+TC/J	1.	0.500
8	6	ESPT2	0.000	32.00	0.000	+TC/E	1.	0.500
7	7	ESPT3	0.000	32.00	0.000	+TC/E	1.	0.500
6	8	Ramp ang	14.05	14.53	-0.301	+NOZERO	1.	10.00
2	9		.0021	0.495	-.0418	-PREF	1.	10.00
15	10		0.000	1.000	0.000	^SREF	1000.	0.002
31	11		459.6	32.00	0.000	+TC/J	1.	12.00

CONST_HARDWARE.DAT

```
#FORMAT 104
* General comments :
*  HS, burst, and RMS scan lists :
*          '-' in front of a number means inclusive through. 1 -96.
*  Display, Burst and RMS scans lists :
*          Channels used here must be included in the HS scan list.
*          If a channel is listed more than once in the HS scan list
*          then the display, burst or RMS value is put in the location
*          of last occurrance of that channel in the HS list. Channels
*          should not be repeated in the display, burst or RMS list.
*  Scanivalve scan list must list channels individually.
*  PSI 8400 AIU data is only processed one of two ways.
*          a) T/C data with 32 deg or 150 deg ref.
*          b) 3rd order equ. without zero or ref.
*  PSI 8400 considerations.
*          a) The SDU only runs at 20K Hz
*          b) The AIU only runs at 5K Hz
*          c) When the PSI 8400 is externally triggered by the HP 3852 the
*                  SPER must be in the range of 0.001 to 0.00001 sec.
*          d) For speed and because the AIU has a filter, frame = 1
*          e) Does PSI burst work when HP burst is off ?
```

```
*              f) When PSI is sycn. to HP3852, they must each have the
*                        same number of TPN's per burst.
*  For PSI data to be processed correctly, the number of channels per
*              pressure module or voltage module must be the same when
*              data is recalled as it was when the data was taken. This is
*              true whether or not the "use PSI flag"s are true or false.
*              If no space for the PSI 8400 data is to be allocated, then
*              the addresses for the AIU must be 0 and the number of
*              channels per each calibrate range must be 0.
*
* device and facility information
*
'SARL'          ! facility
'_ixa0:'        ! IEEE-488 device name
1               ! PSI 780 address
5               ! PSI 8400 address
3               ! hp_address

  PSI 8400 plug in information
*                       (CRS- Cluster Rack Slot)
111             ! CRS of SDU, only one (SDU- Scanner Digitizer Unit)
211 213 215     ! CRS's of PCU's, up to three (PCU- Pressure Cal Unit)
0               ! CRS's of AIU's, up to six (AIU- Analog Input Unit)
*
* HP3852 plug in information
*
18              ! slot no. of high speed a/d HP44702A
14              ! slot no. of 1st HP44711A mux
4               ! no of high speed muxes
24              ! no. of chan per slot
13              ! slot no. of 1st counter card
1               ! no of counter cards
5               ! slot no. of first digital output, HP44724
1               ! slot no. of first digital input, HP44721
*
* HS data acquisition information
*
.true.          ! HS, high speed system off/on, must be true for RMS etc.
1 -96           ! HS scan list
50              ! number sample per channel for HP3852 hs
.0003           ! A/D sample rate (SPER) is seconds
*
* HS display data acquisition information
*
```

```
1 -96              ! Display scan list, must be subset of HS scan list
5                  ! number sample per channel for HP3852 hs display
.0001              ! A/D sample rate (SPER) in seconds
*
* HS burst data acquisition for HS channels
*
.true.             ! HS burst off/on, use HS must be true
1 -48              ! Burst scan list, must be subset of HS scan list
3                  ! number sample per channel for HP3852 burst
.00001             ! A/D sample rate (SPER) in seconds
108                ! no of scans for burst data
0.05               ! no of sec between scan for burst
.false.            ! external input trig off/on
*
* RMS data acquisition information
*
.false.            ! RMS off/on, use HS must be true
1 2                ! RMS scan list, must be subset of HS scan list
4093               ! number sample per channel for HP3852 hs rms
.0001              ! A/D sample rate (SPER) in seconds
*
* Scanivalve data acquisition information
*
.false.            ! SV, scanivalve system off/on, use HS must be true
34                 ! scanivalve scan list, must be dicrete chan of HS list
50                 ! number of samples per scani channel
.0002              ! A/D sample rate (SPER) in seconds
25                 ! number of steps
4                  ! max delay between steps in seconds
.4                 ! delay between scani tolerance checks in seconds
0.004 0.001 0.001 0.001 0.001 0.05 0.05      ! ratio of
*                  allowed change to full scale before sv will step
*
*  PSI 780 data acquisition information
*
.false.            ! PSI 780 system off/on
16 16 16 16        ! channels per module range 1
0                  ! channels per module for calibration range 2
0                  ! channels per module for calibration range 3
20                 ! seconds between cal. points on psi system
*
*  PSI 8400 data acquisition information
*
.true.                        ! Use pressure part of PSI 8400 system
```

```
-5 -2.5 0 2.5 5 5 DIFF      ! five cal pres, max pres & mode (ABS/DIFF) range 1
 1 8 15 22 29 45 DIFF       ! five cal pres, max pres & mode (ABS/DIFF) range 2
1 20 40 60 85 100 DIFF      ! five cal pres, max pres & mode (ABS/DIFF) range 3
1 2 3 4 5 6 7               ! list add of pres modules using cal range #1
8                           ! list add of pres modules using cal range #2
9                           ! list add of pres modules using cal range #3
64 64 64 64 64 64 64        ! no of ports used per module on cal range #1
32                          ! no of ports used per module on cal range #2
64                          ! no of ports used per module on cal range #3
15                          ! seconds between cal. points on psi system
4                           ! no. samples to avg/TPN for pres, used in burst
0                           ! addr of RAMM30, 0 it not used
.false.                     ! Use analog input part of PSI 8400 system
 0                          ! input range (volts) per AUI
*
* PSI 8400 burst data parameters
*
.false.                     ! PSI burst off/on
121                         ! no. of scans for burst data, unless use HS burst
200                         ! A/D sample rate (micro-sec)
50                          ! no. of mil. sec. between scans for burst, ext trig false
.false.                     ! use external input trigger for data acqu.
*
* Store data in file cir_que_raw.bin while in display loop
*
.false.                     ! true to setup and use circular que
*
* Axilary data storage requirements, affects raw_data.bin size
*
0                           ! hs channel no. of balance
10                          ! no of digital channels to store
15                          ! no of ms chan to store with data
*
* Other information
*
.false.                     ! read inputs only mode
'data_sys.menu'             ! file name of menu description
```

COPY_SEED_FILES.COM

```
$ inqu dir_nam "Enter full directory name [xxx], where seeds files are."
$!   programs
```

```
$ copy 'dir_nam'aero_reduc.for *.*
$ copy 'dir_nam'data_sys_spec_fcn.for *.*
$ copy 'dir_nam'data_sys_spec_init.for *.*
$ copy 'dir_nam'spec_plt_cal.for *.*
$ copy 'dir_nam'bal_reduc.for *.*
$!   menues
$ copy 'dir_nam'data_sys.menu *.*
$ copy 'dir_nam'data_sys.menu_plot *.*
$ copy 'dir_nam'data_sys.menu_axis *.*
$!   output control
$ copy 'dir_nam'para_descript.txt *.*
$ copy 'dir_nam'table_descript.txt *.*
$ copy 'dir_nam'op_display.dat *.*
$ copy 'dir_nam'plt_1.axis *.*
$!   startup information
$ copy 'dir_nam'manual_preset.bin *.*
$! copy 'dir_nam'data_status.dat *.*
$ ed data_status.dat
in;0 0 1 1 0
in;0 0
in;1 0 0 0 0 0 0 0 0 0
ex
$ copy 'dir_nam'const_hardware.dat *.*
$ copy 'dir_nam'const_gen.bin *.*
$ copy 'dir_nam'data_sys.macro *.*
$!   commmand
$ copy 'dir_nam'data_sys.com *.*
$ copy 'dir_nam'data.com *.*
$ copy 'dir_nam'ru_calibrate.com *.*
$ copy 'dir_nam'ru_ed_const.com *.*
$!   dead weight standard info
$ copy 'dir_nam'dwt_elevation.dat *.*
```

DATA.COM

```
$!
$! DATA.COM for TGF... assigns tta0: to for028 for power vibration
$!
$! FIND USER_NAME
$ user_name = f$getjpi(0,"USERNAME")
$ user_name = f$edit(user_name,"COLLAPSE")
$!
```

```
$ DEFINE DATA_COMMON -
        DUB0:[GLENN.DATA_ACQU.OP_DISP]DATA_COMMON.EXE
$ clear_scr := [2J [1;1H
$ write sys$output clear_scr
$! open const_hardware.dat and read the facility variable.
$!
$ open/read facility const_hardware.dat
$ loop:
$ read/end_of_file=thatsall facility all_dat
$ fac_nam = f$extract(1,6,all_dat)
$ if (fac_nam .eqs. "'SARL'") then goto display_0
$ if (fac_nam .eqs. "'TGF'   ") then goto display_0
$ if (fac_nam .eqs. "'HWT'   ") then goto display_0
$ if (fac_nam .eqs. "'VERT'  ") then goto display_1
$ if (fac_nam .eqs. "'M6'    ") then goto display_1
$ if (fac_nam .eqs. "'M3'    ") then goto display_1
$ if (fac_nam .eqs. "'LAB'   ") then goto display_1
$ goto loop
$!
$ thatsall:
$ close facility
$ write sys$output " Can't find facility name in const_hardware.dat" $ exit
$!
$ display_0:
$ close facility
$ if (user_name .nes. "FACILITY") then goto notreal_0
$ if (p1 .eqs. "LOW") then goto notreal_0
$ SET PROCESS/PRIORITY = 18
$ if (p1 .eqs. "OFF") then goto no_disp_0
$ DEFINE OPDISP0 [FACILITY.OP_DISP]START_DISP_0_HIGH.COM
$ write sys$output clear_scr
$ write sys$output "RUNNING DATA_SYS AND OP_DISPLAY IN REALTIME"
$ assign/user_mode sys$command: sys$input:
$ assign tta0: for028
$ ru data_sys
$ gosub kill0
$ exit
$! FIND IF OP_DISPLAY_0 IS STILL RUNNING
$!
$ kill0:
$    next = 0
$    start:
$    pid = f$pid(next)
$    if pid .eqs. "" then goto notfound
```

```
$    proname = f$getjpi(pid,"PRCNAM")
$    if proname .eqs. "OP_DISPLAY_0" then goto found
$    goto start
$    found:
$    stop process/id = 'pid'
$    write sys$output "  "
$    write sys$output proname," WAS STOPPED."
$    goto gotit
$    notfound:
$    write sys$output "  "
$    write sys$output "  "
$    write sys$output "CAN'T FIND OP_DISPLAY_0"
$    gotit:
$    return
$!
$notreal_0:
$ SET PROCESS/PRIORITY = 4
$ if (p2 .eqs. "OFF") then goto no_disp_0
$ DEFINE OPDISP0 [FACILITY.OP_DISP]START_DISP_0_LOW.COM
$ write sys$output clear_scr
$ write sys$outputT "RUNNING DATA_SYS AND OP_DISPLAY IN LOWER PRIORITY"
$ assign/user_mode sys$command: sys$input:
$ assign tta0: for028
$ ru data_sys
$ gosub kill0
$ if (user_name .nes. "FACILITY") then exit
$ SET PROCESS/PRIORITY = 18  ! RETURN TO ORIGINAL PRIORITY
$ exit
$!
$ display_1:
$ close facility
$ if (user_name .nes. "FACILITY") then goto notreal_1
$ if (p1 .eqs. "LOW") then goto notreal_1
$ SET PROCESS/PRIORITY = 18
$ if (p1 .eqs. "OFF") then goto no_disp_1
$ DEFINE OPDISP1 [FACILITY.OP_DISP]START_DISP_1_HIGH.COM
$ write sys$output clear_scr
$ write sys$output "RUNNING DATA_SYS AND OP_DISPLAY IN REALTIME"
$ assign/user_mode sys$command: sys$input:
$ assign tta0: for028
$ ru data_sys
$ gosub kill1
$ exit
$!
```

```
$! FIND IF OP_DISPLAY_1 IS STILL RUNNING
$!
$ kill1:
$    next_1 = 0
$    start_1:
$    pid_1 = f$pid(next_1)
$    if pid_1 .eqs. "" then goto notfound_1
$    proname_1 = f$getjpi(pid_1,"PRCNAM")
$    if proname_1 .eqs. "OP_DISPLAY_1" then goto found_1
$    goto start_1
$    found_1:
$    stop process/id = 'pid_1'
$    write sys$output "  "
$    write sys$output proname_1," WAS STOPPED."
$    goto gotit_1
$    notfound_1:
$    write sys$output "  "
$    write sys$output "  "
$    write sys$output "CAN'T FIND OP_DISPLAY_1"
$    gotit_1:
$    return
$!
$notreal_1:
$ SET PROCESS/PRIORITY = 4
$ if (p2 .eqs. "OFF") then goto no_disp_1
$ DEFINE OPDISP1 [FACILITY.OP_DISP]START_DISP_1_LOW.COM
$ write sys$output clear_scr
$ write sys$output "RUNNING DATA_SYS AND OP_DISPLAY IN LOWER PRIORITY"
$ assign/user_mode sys$command: sys$input:
$ assign tta0: for028
$ ru data_sys
$ gosub kill1
$ if (user_name .nes. "FACILITY") then exit
$ SET PROCESS/PRIORITY = 18  ! RETURN TO ORIGINAL PRIORITY
$ exit
$!
$no_disp_0:
$ define OPDISP0  "no operator display"
$ write sys$output clear_scr
$ write sys$output "RUNNING DATA_SYS WITH NO OP_DISPLAY"
$ assign/user_mode sys$command: sys$input:
$ assign tta0: for028
$ ru data_sys
$ if (user_name .nes. "FACILITY") then exit
```

```
$ if (p1 .nes. "LOW") then exit
$ SET PROCESS/PRIORITY = 18  ! RETURN TO ORIGINAL PRIORITY
$ exit
$!
$no_disp_1:
$ define OPDISP1  "no operator display"
$ write sys$output clear_scr
$ write sys$output "RUNNING DATA_SYS WITH NO OP_DISPLAY"
$ assign/user_mode sys$command: sys$input:
$ assign tta0: for028
$ ru data_sys
$ if (user_name .nes. "FACILITY") then exit
$ if (p1 .nes. "LOW") then exit
$ SET PROCESS/PRIORITY = 18  ! RETURN TO ORIGINAL PRIORITY
$ exit
```

DATA_STATUS.DAT

```
      751        703         1         1        111
       96         0
    1    2    6    8   99   98    7    0    0    0
```

DATA_SYS.COM

```
$ fo data_sys_spec_init
$ fo data_sys_spec_fcn
$ fo spec_plt_cal
$ fo aero_reduc
$ pu data_sys_spec_init.obj
$ pu data_sys_spec_fcn.obj
$ pu spec_plt_cal.obj
$ pu aero_reduc.obj
$ copy [glenn.data_acqu]data_sys.obj *.*
$ pu data_sys.obj
$ link  data_sys, -
     data_sys_spec_init, -
     data_sys_spec_fcn, -
     spec_plt_cal, -
     aero_reduc, -
     [glenn.data_acqu]cal_force_mon, -
```

[glenn.data_acqu]reduc_data, -
[glenn.data_acqu]operator_display, -
[glenn.data_acqu]plot_util_subs/lib, -
[glenn.data_acqu]data_acqu_subs/lib, -
[utilities]lib_menu/library, -
[utilities]iexsui.obj_old, -
[ismael.data_plots]aero_plot.obj, -
[issco.dis10p5.lib]dislib/l, -
[issco.dis10p5.lib]gkslib/l, -
[issco.dis10p5.lib]intlib15/l, -
[issco.dis10p5.lib]dislib/l, -
[issco.dis10p5.lib]gkslib/l, -
[issco.dis10p5.lib]intlib15/l

DATA_SYS.MACRO

Toggle-Print: off
Process-Reset plot
Process-Reset recall
Macro-End Learn
Macro-End Learn
Macro-End Learn
Macro-End Learn
Macro-End Learn
Macro-End Learn
Macro-End Learn
Toggle-Print: horz table
Diagnostic-Auto recall
Process-Reset plot
Process-Reset recall
Toggle-Print: off
Macro-End Learn
Macro-End Learn
.....
.....
Macro-End Learn
Toggle-Print: off
Toggle-PSI: on
Macro-End Learn
Macro-End Learn
Macro-End Learn
Macro-End Learn

Macro-End Learn
Macro-End Learn
Macro-End Learn
Macro-End Learn

DATA_SYS.MENU

```
'Setup' 'bar'
  'Exit' .true.
  'Take analog zeros' .true.
  'Take balance tares' .true.
  'Set digital references' .true.
  'Calibrate PSI' .true.
  'Calibrate HS' .true.
  'Rezero HS' .true.
  'Restore tare' .true.
  'Restore zero' .true.
'Process' 'bar'
  'Operator display' .true.
  'Timed loop' .true.
  'All systems' .true.
  'Selected' .true.
  'HS only' .true.
  'Scani only' .true.
  'Reset plot' .true.
  'Reset recall' .true.
  'Plot type A' .true.
  'Plot type B' .true.
'Entry' 'bar'
  'Part No.' .true.
  'Change const id' .true.
  'Reset TPN' .true.
  'Rake roll' .true.
  'Rake axial' .true.
  'Model Parameters' .true.
  'Comment' .true.
'Diagnostic' 'bar'
  'Recall data' .true.
```

```
  'Auto recall' .true.
  'Print recorded HS' .true.
  'Print recorded tares' .true.
  'Change recall mode' .true.
  'Read HS Channel' .true.
  'Read rear term' .true.
  'Print HS Chan List' .true.
  'Histogram Chan' .true.
  'Enter bal volt' .true.
'Toggle' 'bar'
  'Print: page to LN03' .true.
  'Save: raw only' .true.
  'HS: on' .true.
  'PSI: off' .true.
  'Scani: off' .true.
  'Pages on: all' .true.
  'Alternate menu' .true.
'Force Proc' 'bar'
  'Zero off' .false.
  'Tare off' .false.
  'Const off' .false.
  'Comment off' .false.
  'Model Parameters off' .false.
'Macro' 'bar'
  'Execute' .true.
  'Begin Learn' .true.
  'End Learn' .true.
  'List' .true.
  'Clear' .true.
```

DATA_SYS.MENU_AXIS

```
'Files' 'bar'
  'current file id:' .true.          ! plt_stat.cur_id
  'open file' .true.
  'close file' .true.
  'list open id' .true.
  'copy' .true.
  'save' .true.
  'create' .true.
  'print' .true.
'Axis' 'bar'
```

```
  'current file id:' .true.          ! plt_stat.cur_id
  'current axis:' .true.             ! toggle throu poss axis
  'no axis:' .true.                  ! spec().no_axis
  'plot page format:' .true.         ! spec().form_id
  'comment' .true.                   ! plt(,).comment
  'Xmin:' .true.                     ! plt(,).min_x
  'Xmax:' .true.                     ! plt(,).max_x
  'Ymin:' .true.                     ! plt(,).min_y
  'Ymax:' .true.                     ! plt(,).max_y
  'X step:' .true.                   ! plt(,).step_x
  'Y step:' .true.                   ! plt(,).step_y
  'X ticks:' .true.                  ! plt(,).tick_x
  'Y ticks:' .true.                  ! plt(,).tick_y
  'X dash:' .true.                   ! plt(,).dash_x
  'Y dash' .true.                    ! plt(,).dash_y
'Label' 'bar'
  'current file id:' .true.          ! plt_stat.cur_id
  'current axis:' .true.             ! toggle throu poss axis
  'X axis:' .true.                   ! plt(,).x_lab
  'Y axis:' .true.                   ! plt(,).y_lab
  'title:' .true.                    ! anot().tit_lab
'Curve' 'bar'
  'current file id:' .true.          ! plt_stat.cur_id
  'current axis:' .true.             ! toggle throu poss axis
  'current curve:' .true.            ! toggle thro poss cur on axis
   'no curves:' .true.               ! plt(,).no_cur_tpn, defined in *.axis
   'use data set:' .true.            ! plt(,).data_set(), defined in *.axis
   'line:' .true.                    ! plt(,).line_onused to get
   'symbol:' .true.                  ! plt(,).symbol_onplt(,).mark_conect
   'start sym:' .true.               ! plt(,).start_symb
'Points' 'bar'
  'current file id:' .true.          ! plt_stat.cur_id
  'current axis:' .true.             ! toggle throu poss axis
  'current curve:' .true.            ! toggle thro poss cur on axis
   'current X&Y pair no:' .true.
  'no X&Y pairs:' .true.             ! plt(,).no_pnt_cur_tpn()
  'incro X&Y pair no' .true.         ! toggle throu poss points
   ' X:' .true.                      ! plt(,).name_x()
  ' Y:' .true.                       ! plt(,).name_y()
'Anotation' 'bar'
  'current file id:' .true.          ! plt_stat.cur_id
  'row number:' .true.
  'column number:' .true.
  'linked to curve:' .true.
```

```
  'format' .true.                    ! anot.para_format()
  'info type:' .true.
  ' item 1 name:' .false.
  ' item 1 relative TPN:' .false.
  ' item 2 name:' .false.
  ' item 2 relative TPN:' .false.
  'exchange current' .true.
  'move current' .true.
  'copy current' .true.
'Miscellaneous' 'bar'
  'Exit' .true.
  'Data menu' .true.
  'Plot menu' .true.
```

DATA_SYS.MENU_PLOT

```
'Setup' 'bar'
  'Exit' .true.
'Process' 'bar'
  'Plot Generic' .true.
  'Plot type A' .true.
  'Plot type B' .true.
  'Reset plot' .true.
'Diagnostic' 'bar'
  'Recall data' .true.
  'Print recorded HS' .true.
  'Print recorded tares' .true.
'Toggle' 'bar'
  'Print to:' .true.
  'Pages on:' .true.
  'Print format:' .true.
  'Plot to:' .true.
  'Axis menu' .true.
  'Data menu' .true.
'Macro' 'bar'
  'Execute' .true.
  'Begin Learn' .true.
  'End Learn' .true.
  'List' .true.
  'Clear' .true.
```

MANUAL_PRESET.BIN

-6.9303387E-05
15.00000
2.000000
45.00000
110.0000
868.5020
0.0000000E+00
1.7636982E+25
4.5927420E+27
0.0000000E+00
0.0000000E+00
0.0000000E+00
0.0000000E+00
0.0000000E+00
0.0000000E+00
0.0000000E+00
0.0000000E+00
0.0000000E+00
0.0000000E+00
0.0000000E+00
28.00000
10.50000
6.1499998E-03
0.8007000
-0.4000000
0.0000000E+00
0.0000000E+00
0.0000000E+00
0.0000000E+00
0.0000000E+00
0.0000000E+00
0.0000000E+00
0.0000000E+00
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0.0000000E+00

OP_DISPLAY.DAT

'TPN'	'TPN ='	'f5.0,3x'
'MACH'	'MACH NO'	'f8.3'
'P0'	'P0 ='	'f8.3'
'PS'	'PS ='	'f8.3'
'T0'	'T0 ='	'f8.3'
'Q'	'Q ='	'f8.3'
'Pitch'	'Pitch '	'f8.3'
'Roll ang'	'Roll ang '	'f8.3'
'ESPT1'	'ESP1 t/c'	'f8.3'
'ESPT2'	'ESP2 t/c'	'f8.3'
'ESPT3'	'ESP3 t/c'	'f8.3'
'Ramp ang'	'Ramp ang '	'f8.3'
'*PS 63'	'I4 = '	'f8.3'
'*PS 47'	'C15 = '	'f8.3'
'*SCREEN 1'	' '	'2x'
'*VT 16'	'GUID'	'f8.3'
'*VT 17'	'# 1'	'f8.3'
'*VT 18'	'# 2'	'f8.3'
'*VT 19'	'# 3'	'f8.3'
'*VT 20'	'# 4'	'f8.3'
'*VT 21'	'# 5'	'f8.3'
'*VT 22'	'# 6'	'f8.3'
'*VT 23'	'# 7'	'f8.3'
'*VT 24'	'# 8'	'f8.3'
'*VT 25'	'# 9'	'f8.3'
'*VT 26'	'# 10'	'f8.3'
'*SCREEN 2'	' '	'2x'
'*PS 1'	'M1 - P1'	'f8.3'
'*PS 32'	'M1 - P32'	'f8.3'
'*PS 33'	'M2 - P1'	'f8.3'

'*PS 80'	'M2 - P48'	'f8.3'
'*VT 08'	'lvdt'	'f8.3'
'Ramp ang'	'Ramp ang'	'f8.3'
'*VT 09'	'rvdt'	'f8.3'
'*HS 9'	'rake pos'	'f8.3'

PARA_DESCRIPT.TXT

#126-1992
* Comment lines have a "*" in column two.
* Columns in this file are not important, however, separate fields by
* spaces, and put single quotes around character fields.
* The begining of a page is marked/flagged by putting the string '#page' in
* columns two through six. The page number may follow, but is only
* used as a comment.
* The begining of a logical line is marked/flagged by putting the string
* '#line' in columns two through six. A logical output line is one
* heading or one data line. A heading logical line is one physical
* line on the printed output. A logical data line can be one
* to three physical lines on the printed output. A data line can be
* data only (one physical line), name above data only (two physical
* lines), or name and units above data (three physical lines).
* Field one will have the logical value of T or F. It should be F for
* records containing labels. For other records use T if this item
* is to be displayable/plottable. Use F if this item will not be
* displayable/plottable.
* Field two defines the data column (12 printer columns wide) number
* (not paper column) the data is to be printed on. Enter zero as a
* place holder if a heading is being defined.
* Field three defines the channel number of the device specified in field
* six to be printed at this loaction.
* Field four defines the device code or data type:
* LB - label or heading
* HS - HP3852 high speed channels
* HR - HP3852 high resolution channels
* PS - PSI channels
* SV - Scanivalve data
* DG - HP3852 digital input channels
* DR - derived parameters
* MS - manual set data
* Field five
* When field four is LB then field seven is a heading/label.

```
*       When field four is not LB then field seven is:
*               1) a item/parameter name that will be printed, or
*               2) the sting 'null', and do not print this line if all
*                       field seven's of this line are "null'
*                       and the name may be in field six, or
*               3) a space, then the name may be in field six.
* Field six
*       When field four is LB then field eight shall be a space.
*       When field four is not LB, and any field five of this line not the
*                       string 'null' then field six is:
*               1) a item/parameter name and is printed or
*               2) a space, thus no item/parameter name for value.
*               3) the string 'null', thus no item/parameter name for value
*                       and do not print this line if all field six's
*                       of this line are 'null'.
*       When field four is not LB, and all field five's of this line are  the
*                       string 'null' then field six is:
*               1) a item/parameter name not printed or
*               2) a space, thus no item/parameter name for value.
*               3) the string 'null', thus no item/parameter name for value
*                       and do not print this line if all field six's
*                       of this line are the string 'null'.
*       When field four is not LB, and field five is not a space or the string
*                       'null' then field six is:
*               1) the units of the value or
*               2) a space, thus no units or
*               3) the string 'null', thus no units and do not print in
*                       this postion.
* Field seven is the format to print the value of the specified item in
*       when field four is not 'LB'. The format must use 12 columns.
* Names following record "*NEW*" are used for calculation, display, and
*       plotting; but not for printing.
*
#page 1
#line
F   0       1   'LB'      'Trisonic Gasdynamics Facility'    ''    ''
#line
F   0       2   'LB'      'Air Force Wright Aeronautical Laboratory'   ''   ''
#line
F   0       3   'LB'      'WPAFB, Ohio'   ''   ''
#line
F   0       4   'LB'      'Project : F16 FOREBODY BLOWING TEST'   ''   ''
#line
F   0      50   'LB'      'used to put times and dates in'   ''     ''
```

```
#line
F   0      49   'LB'    'used to put comments in'   ' '   ' '
#line
F   0       5   'LB'    ' '      ' '    ' '
#line
F   0       8   'LB'    'CONTROL PARAMETER'     ' '       ' '
#line
T   1       1   'DR'    ' '          'TPN'      'f5.0,7x'
T   2       2   'DR'    ' '          'ZTPN'     'f5.0,7x'
T   3       3   'DR'    ' '          'Constant' 'f5.0,7x'
T   5       3   'MS'    'Atm '       'psia'     'f7.2,5x'
T   6       4   'MS'    'Roll ang '  'Deg'      'f7.2,5x'
T   7       6   'MS'    'Prebend'    'Deg'      'f7.2,5x'
T   8       8   'MS'    'Anozz'      'aera'     'f7.6,5x'
#line
F   0       5   'LB'    ' '          ' '        ' '
#line
F   0      18   'LB'    'BLOWING CONDITION'   ' '    ' '
#line
T   1       2   'HS'    'Flow T '    'deg R'    'f7.2,5x'
T   2       1   'HS'    'Supply '    'psia'     'f7.2,5x'
T   4      10   'HS'    'Del_P'      'psia'     'f7.2,5x'
T   5       2   'MS'    'Orf dia '   'inch'     'f7.2,5x'
T   6      16   'MS'    'Orf ID '    'chan.'    'f7.2,5x'
T   7     100   'DR'    'Mdot  '     'Lbm/sec'  'f7.4,5x'
#line
F   0       6   'LB'    'TEST CONDITIONS'     ' '      ' '
#line
F   0       5   'LB'    ' '          ' '        ' '
#line
T   1       4   'DR'    'MACH'       ' '        'f6.3,6x'
T   2      14   'DR'    'Q'          'psf'      'f6.2,6x'
T   3       5   'DR'    'P0'         'psfa'     'f7.2,5x'
T   4      19   'DR'    'PS'         'psfa'     'f7.2,5x'
T   5       3   'HS'    'T0'         'deg R'    'f10.2,2x'
T   6      10   'DR'    'T'          'deg R'    'f10.2,2x'
T   7       6   'DR'    'VEL'        'Ft/Sec'   'f6.0,6x'
T   8       7   'DR'    'RN'         'null'     'g12.5'
#line
F   0       5   'LB'    ' '          ' '        ' '
#line
T   1       4   'HS'    'Pitch'      'deg '     'f7.2,5x'
T   2     105   'DR'    'C_Pitch'    'deg '     'f7.2,5x'
#line
```

```
F   0     5   'LB'   ' '              ' '          ' '
#line
F   0     11  'LB'   'BALANCE DATA'   ' '    ' '
#line
T   1     91  'HS'   'N1'             'volts'      'f10.6,2x'
T   2     92  'HS'   'N2'             'volts'      'f10.6,2x'
T   3     93  'HS'   'Y1'             'volts'      'f10.6,2x'
T   4     94  'HS'   'Y2'             'volts'      'f10.6,2x'
T   5     95  'HS'   'Roll'           'volts'      'f10.6,2x'
T   6     96  'HS'   'Axial'          'volts'      'f10.6,2x'
#line
F   0     5   'LB'   ' '              ' '          ' '
#line
T   1     201 'DR'   'NF'             'lbs'        'f7.2,6x'
T   2     202 'DR'   'PM'             'in-lb'      'f7.2,6x'
T   3     203 'DR'   'SF'             'lbs'        'f7.2,6x'
T   4     204 'DR'   'YM'             'in-lb'      'f7.2,6x'
T   5     205 'DR'   'RM'             'in-lb'      'f7.2,6x'
T   6     206 'DR'   'AXIAL'          'lbs'        'f7.2,6x'
#line
F   0     12  'LB'   'PLENUM PRESSURES'  ' '    ' '
#line
T   1     6   'HS'   'Pplen_L'         'psi'        'f7.2,6x'
T   2     7   'HS'   'Tplen_L'         'deg R'      'f7.2,6x'
T   3     8   'HS'   'Pplen_R'         'psi'        'f7.2,6x'
T   4     9   'HS'   'Tplen_R'         'deg R'      'f7.2,6x'
#line
F   0     9   'LB'   'NOZZLE BLOWING COEFFICIENTS'   ' '    ' '
#line
T   1     101 'DR'   'Left_Cmu'       ' '          'f7.4,6x'
T   2     103 'DR'   'Right_Cmu'      ' '          'f7.4,6x'
T   3     102 'DR'   'Cq'             ' '          'f7.4,6x'
#line
F   0     5   'LB'   ' '              ' '          ' '
#line
f   0     22  'LB'   'Body Axis Coeficients'  ' '      ' '
#line
t   1     301 'DR'   ' '              'CNB'        'f7.4,6x'
t   2     304 'DR'   ' '              'CPMB'       'f7.4,6x'
t   3     302 'DR'   ' '              'CYB'        'f7.4,6x'
t   4     305 'DR'   ' '              'CYMB'       'f7.4,6x'
t   5     306 'DR'   ' '              'CRMB'       'f7.4,6x'
t   6     303 'DR'   ' '              'CAB'        'f7.4,6x'
```

PLT_*.AXIS :

```
* axis A                          ! begin definitions of axis for coordinates A
'F-16 FOREBODY TEST'              ! comment to help id purpose or plot
'QUAD '                           ! coordinate layout, 1,2,3 or 4 per page
0.0000000E+00                     ! minimum on x-axis
  50.00                           ! maximum on x-axis
-5.0000001E-02                    ! minimum on y-axis
 5.0000001E-02                    ! maximum on y-axis
  10.00000                        ! x step
 2.5000000E-02                    ! y step
         1                        ! x ticks, divisions between steps
         1                        ! y ticks, divisions between steps
         0                        ! x dash, divisions between ticks
         0                        ! y dash, divisions between ticks
         1                        ! >0 connect sym, =0 line, <0 sym no connect
'AOA'                             ! x axis label
'CYB'                             ! y axis label
'F-16 Forebody Blowing'           ! label to put on top of page
      3                           ! symbol id to use on first curve
     1      0                     ! no. of x-y pairs, and data set number
'C_Pitch '                        ! name of parameter to use for x
'CYB     '                        ! name of parameter to use for y
* axis B                          ! begin definitions of axis for coordinates B
'F-16 FOREBODY TEST'
'QUAD '
 0.0000000E+00
  50.00000
-5.0000001E-02
 5.0000001E-02
  10.00000
 2.0000000E-02
         1
         1
         0
         0
         1
'AOA'
'CYMB'
'F-16 Forebody Blowing'
     3
     1      0
'C_Pitch ' '
```

```
'CYMB    ' '
* axis C                          ! begin definitions of axis for coordinates C
'F-16 FOREBODY TEST'
'QUAD '
 0.0000000E+00
  50.00000
 0.0000000E+00
 0.5000000
  10.00000
 0.1000000
          1
          1
          0
          0
          1
'AOA'
'CNB'
'F-16 Forebody Blowing'
     3
     1      0
'C_Pitch ' '
'CNB     ' '
* axis D                          ! begin definitions of axis for coordinates C
'F-16 FOREBODY TEST'
'QUAD '
 0.0000000E+00
  50.00000
 0.0000000E+00
 0.5000000
  10.00000
 0.1000000
          1
          1
          0
          0
          1
'AOA'
'CPMB'
'F-16 Forebody Blowing'
     3
     1      0
'C_Pitch ' '
'CPMB    ' '
* anot                            ! begin definitions of annotations
```

```
'TPN     '          1 'P0      '          1
    1 '("TPN=",f5.0,"   P0=",f7.1,"$")'
'Mdot    '          1 'MACH    '          1
    1 '("Mdot=",f6.4,"  MACH=",f6.3,"$")'
'Supply  '          1 '        '          0
    1 '("Supply=",f6.1,"$")'
'TPN     '          1 'P0      '          1
    2 '("TPN=",f5.0,"   P0=",f7.1,"$")'
'Mdot    '          1 'MACH    '          1
    2 '("Mdot=",f6.4,"  MACH=",f6.3,"$")'
'Supply  '          1 '        '          0
    2 '("Supply=",f6.1,"$")'
'TPN     '          1 'P0      '          1
    3 '("TPN=",f5.0,"   P0=",f7.1,"$")'
'Mdot    '          1 'MACH    '          1
    3 '("Mdot=",f6.4,"  MACH=",f6.3,"$")'
'Supply  '          1 '        '          0
    3 '("Supply=",f6.1,"$")'
'TPN     '          1 'P0      '          1
    4 '("TPN=",f5.0,"   P0=",f7.1,"$")'
'Mdot    '          1 'MACH    '          1
    4 '("Mdot=",f6.4,"  MACH=",f6.3,"$")'
'Supply  '          1 '        '          0
    4 '("Supply=",f6.1,"$")'
'TPN     '          1 'P0      '          1
    5 '("TPN=",f5.0,"   P0=",f7.1,"$")'
'Mdot    '          1 'MACH    '          1
    5 '("Mdot=",f6.4,"  MACH=",f6.3,"$")'
'Supply  '          1 '        '          0
    5 '("Supply=",f6.1,"$")'
'TPN     '          1 'P0      '          1
    6 '("TPN=",f5.0,"   P0=",f7.1,"$")'
'Mdot    '          1 'MACH    '          1
    6 '("Mdot=",f6.4,"  MACH=",f6.3,"$")'
'Supply  '          1 '        '          0
    6 '("Supply=",f6.1,"$")'
'TPN     '          1 'P0      '          1
    7 '("TPN=",f5.0,"   P0=",f7.1,"$")'
'Mdot    '          1 'MACH    '          1
    7 '("Mdot=",f6.4,"  MACH=",f6.3,"$")'
'Supply  '          1 '        '          0
    7 '("Supply=",f6.1,"$")'
'TPN     '          1 'P0      '          1
    8 '("TPN=",f5.0,"   P0=",f7.1,"$")'
```

```
'Mdot    '          1 'MACH    '          1
    8 '("Mdot=",f6.4,"  MACH=",f6.3,"$")'
'Supply  '          1 '        '          0
    8 '("Supply=",f6.1,"$")'
```

RAW_DATA_SPECIFICATION.TXT

```
  167 record length in words of raw_data.bin
   15 no. of manual set channels
  106 no. of HS channels
    0 no. of SV channels
    5 no. of DG channels
   91 zero if balance not used
    F PSI used or not
    0 no. of PSI channels used
  134 (132,126) bytes used for general items
    7 words if balance is used
```

SAVE_CALCULATED.DAT

```
Taken on  5/26/89 at 15:54:28 and Printed on  5/26/89 at 15:54:31
This is a zero comment.
     1.        0.        1.        6.        0.        0.        0.000     1.00
  2052.     2052.      538.      100.        DOWN      Wing On     Prob
                       900.      700.
Taken on  5/26/89 at 15:54:45 and Printed on  5/26/89 at 15:54:46
This is a data point comment.
     2.        0.        1.        5.        0.        0.        0.000     1.00
  2052.     2052.      538.      100.        DOWN      Wing On     Prob
                      1100.      900.
 Taken on  5/26/89 at 15:55:26 and Printed on  5/26/89 at 15:55:28
 This is a data point comment.
     3.        0.        1.        5.        0.        0.        0.000     1.00
  2052.     2052.      538.      100.        DOWN      Wing On     Prob
                      1300.     1100.
 Taken on  5/26/89 at 15:55:30 and Printed on  5/26/89 at 15:55:31
 This is a data point comment.
     4.        0.        1.        5.        0.        0.        0.000     1.00
  2052.     2052.      538.      100.        DOWN      Wing Off    Prob
                      1500.     1300.
```

```
Taken on  5/30/89 at 08:01:43 and Printed on  5/30/89 at 08:01:45
This is a data point comment.
    2.       0.       1.       6.       0.       0.       0.000    1.00
 2052.    2052.     538.     100.        UP     Wing On     Prob
                    1100.     900.
Taken on  5/30/89 at 08:01:46 and Printed on  5/30/89 at 08:01:48
This is a data point comment.
    3.       0.       1.       5.       0.       0.       0.000    1.00
 2052.    2052.     538.     100.      DOWN     Wing On     Prob
                    1300.    1100.
```

TABLE_DESCRIPT.TXT

```
*
*
* Field one is zero for labels to be put on each page.
* Field one is negative page number for label to be put on specific page.
* Field one is page number otherwise.
* Field two is a string interpreted as follows :
*         1) The name of the item whose value is to be output in the order
*                 they appear in this file.
*         2) A label to be printed.
*         3) If it is "null", a blank column will be output for horz. mode
*                 or a blank row for vert. mode.
*         4) If it is "*DATA_COMMENT*" then the comment from the recorded
*                 data is printed with the labels.
*         5) If it is "*DATA_DATE*" then the date from the recorded data
*                 and the current date is printed with the labels.
*         6) If it is "*COMxx" (where xx is 01 through 68) prints part of
*                 the com field starting with positon xx for 13 character.
*
*
 0    'Trisonic Gasdynamics Facility'
 0    'WL, WPAFB'
 0    '*DATA_DATE'
 1    'TPN'
 1    'Pplen_L'
 1    'Pplen_R'
 1    '*COM07'
```

APPENDIX C: DATA STRUCTURES USED

This appendix includes a listing of all the data structures used by the FORTRAN programs that make up the working part of this system. These structures are included because they provide a good overall description of the data types used. By studying the comments in these listings, the wide variety of information required to describe the configuration of a wind tunnel test, control the data acquisition, reduce the data, and produce hard copy can be better appreciated. Each file is prefixed by the filename in bold capital letters. Following is a list of the names of the file that containing the data structures:

COMMUN_488_STR.FOR_INC	68
CONST_STRU.FOR_INC	69
DATA_COMMON.FOR_STRUCT	70
DATA_INFO.FOR_STRUCT	71
DATA_INFO_STR.FOR_INC	74
DATA_SYS_FLAG_STR.FOR_INC	74
FAC_CONF_STR.FOR_INC	75
MENU_INTERFACE.INC	78
MENU_SUFX_STR.FOR_INC	78
PARA_POINTER.FOR_INC	79
PLOT_UTIL_SUBS.FOR_INC	84
PLOT_UTIL_SUBS.FOR_STRUCT	85
PNT_TBL.FOR_STRUCT	88
PNT_TBL_STR.FOR_INC	89
REDUC_DATA.FOR_STRUCT	89
REDUC_DATA_STR.FOR_INC	90

COMMUN_488_STR.FOR_INC

```
structure /commun_488/
    byte          impur(80)
    integer*2     channel
    integer*2     hp_listen
    integer*2     hp_talk
    integer*2     psi_listen
    integer*2     psi_talk
    integer*2     psi_cal_rate
    integer*2     psi_84_listen
    integer*2     psi_84_talk
    integer*2     psi_84_cal_rate
    character*6   device_name
    integer*4     maxsam
    byte          poll_result(30)
    byte          poll_stat(30)
    byte          poll_add_lst(30)
    integer*2     no_poll_dev          ! no. of devices in poll list end structure
record /commun_488/io_488

! for PSI 8400 data records
structure         /psi_struct/         ! 2068 bytes
    byte          resp_code            ! SD1 = 11
                                       ! SD2 = 12
                                       ! SD3 = 13
                                       ! PC1 = 31
                                       ! PC2 = 32
                                       ! AI1 = 51
                                       ! AI2 = 52
                                       ! AI3 = 53
                                       ! AD2 = 102
                                       ! OD9 = 119
                                       ! CA3 = 123
                                       ! CA4 = 124
                                       ! CP1 = 161
                                       ! CP2 = 162
                                       ! SC4 = 184
    byte          resp_type            ! 04, 10, 20, 34, 128(-128)
    integer*2     msg_length
    union
       map                             ! confirmation response (04)
```

```
            integer*4  un_used
         end map
         map                                ! error response (128,-1)
            integer*4  error_resp
         end map
         map                                ! DEC single value response (10)
            real*4      sig_data
         end map
         map                                ! DEC stream data response (20)
            integer*2  set_no
            integer*2  no_data
            byte       cluster
            byte       rack
            byte       slot
            byte       mod_typ
            byte       tbl
            byte       fr
            byte       year
            byte       month
            byte       day
            byte       hour
            byte       min
            byte       sec
            integer*2  mil_sec
            byte       spare_1
            byte       spare_2
            real*4     data(512)
         end map
         map                                ! DEC array data response (34)
            integer*2  rows
            integer*2  columns
            real*4     arr_data(512)! index data(rows,columns) end map
      end union
   end structure
```

CONST_STRU.FOR_INC

```
C      FILE ' STRU_ED_CONST.FOR'

      structure /channel_info/
        real*4 a0
```

```
    real*4 a1
    real*4 a2
    real*8 ref
    real*4 gain
    real*4 limit
  end structure

  INTEGER*2
 *       HS_SIZE,
 *       HR_SIZE,
 *       DS_SIZE,
 *       DG_SIZE,
 *       SV_SIZE,
 *       CHAN_INFO_SIZE

  Parameter (Chan_info_size=7)

  Parameter (HS_SIZE=200,
 *           HR_SIZE=50,
 *           DS_SIZE=50,
 *           DG_SIZE=50,
 *           SV_SIZE=50)

   structure /const_type/
     record  /channel_info/ hs(HS_SIZE)
     record  /channel_info/ hr(HR_SIZE)
     record  /channel_info/ ds(DS_SIZE)
     record  /channel_info/ dg(DG_SIZE)
     record  /channel_info/ sv(SV_SIZE)
   real*4   bal(100)
   end structure

   record /const_type/ const
```

DATA_COMMON.FOR_STRUCT

```
  logical*2
  2  current_data_0,
  2  current_data_1,
  2  terminate_disp_0,
  2  terminate_disp_1
```

```
integer*2
2  current_screen_0,
2  current_screen_1

real*4
2  hp_3852_hs_0(MAX_TBL),
2  hp_3852_hs_1(MAX_TBL),
2  value_0(MAX_TEST_PARA),
2  value_1(MAX_TEST_PARA)

character*10
2  fac_id_0,
2  fac_id_1

record      /disp_info/disp_0
record      /disp_info/disp_1

common /shared_data/
2  current_data_0,
2  current_data_1,
2  terminate_disp_0,
2  terminate_disp_1,
2  current_screen_0,
2  current_screen_1,
2  hp_3852_hs_0,
2  hp_3852_hs_1,
2  value_0,
2  value_1,
2  disp_0,                  ! set in init_files_vars
2  disp_1,                  ! set in init_files_vars
2  fac_id_0,                ! set in init_files_vars
2  fac_id_1                 ! set in init_files_vars
```

DATA_INFO.FOR_STRUCT

```
integer*2
2  MAX_TBL,
2  MAX_LIST_SIZE,
2  MAX_PSI,
2  MAX_SV_LIST,
2  MAX_RMS_LIST,
2  MAX_RMS_TBL,
```

```
     2 MAX_BURST_LIST,
     2 MAX_BURST_TBL,
     2 MAAXX_SV,
     2 M_MS,
     2 MAX_DG,
c?   2 NO_PSI_BYT,              not used any longer
     2 NO_SYS_CONST_BYT,
     2 NO_TARE_BYT


     parameter                 (MAX_TBL = 200)
     parameter                 (MAX_LIST_SIZE = 100)
     parameter                 (MAX_PSI = 700)
     parameter                 (MAX_SV_LIST = 20)
     parameter                 (MAX_RMS_LIST = 20)
     parameter                 (MAX_RMS_TBL = 40)
     parameter                 (MAX_BURST_LIST = 20)
     parameter                 (MAX_BURST_TBL = 50)
     parameter                 (MAX_SV = 400)
     parameter                 (MAX_MS = 50)
     parameter                 (MAX_DG = 50)
     parameter                 (NO_SYS_CONST_BYT = 134)
     parameter                 (NO_TARE_BYT = 28)

     structure /data_info/
        real*4     psi(MAX_PSI)              ! raw psi data
        real*4     hp3852_hs(MAX_TBL)        ! raw hp hs data
        real*4     sv(MAX_SV+20)             ! raw hp hs sv data
        real*4     man_dat(MAX_MS)           ! keyed in data
        integer*4  hp3852_dg(MAX_DG)         ! raw digital data
        integer*2  hs_chan_tbl(MAX_TBL)      ! list of discrete hs chan no
        integer*2  no_chan_hs                ! no of hs channels
        integer*2  no_loop                   ! no of sampl loops per tpn
        integer*2  no_sampl_loop             ! no sampl per chan per loop
        integer*2  no_burst                  ! no tpn taken for current burst
        integer*2  scan_list(MAX_LIST_SIZE)  ! hs scan list
        integer*2  list_size                 ! no items in hs scan list
        integer*2  max_list_size             ! max size of hs scan_list
        integer*2  max_tbl                   ! max size of hs_chan_tbl
        integer*2  sv_list(MAX_SV_LIST)      ! sv scan list
        real*4     sv_variance(MAX_SV_LIST)  ! ratio of full scale allowed before step
        real*4     sv_tolerance(MAX_SV_LIST)  ! sv tolerance before step
        integer*2  no_sv_hs                  ! no scani valves on hs channels
        integer*2  no_sv                     ! total no samples for scani valves
```

```
integer*2  max_sv_list                  ! max size of sv_list & sv_chan_list
integer*2  sv_chan_tbl(MAX_SV_LIST)     ! list of discrete sv hs chan no
integer*2  disp_list(MAX_LIST_SIZE)     ! display scan list
integer*2  disp_list_siz                ! no items in disp scan list
integer*2  no_disp_hs                   ! no disp hs channels
integer*2  max_disp_list                ! max size of disp_list & rms_chan_list
integer*2  disp_chan_tbl(MAX_TBL)       ! list of discrete disp hs chan no
integer*2  disp_hs_locat(MAX_TBL)       ! match disp chan no. to hs chan no.
integer*2  rms_list(MAX_RMS_LIST)       ! rms scan list
integer*2  rms_list_siz                 ! no items in rms scan list
integer*2  no_rms_hs                    ! no rms hs channels
integer*2  max_rms_list                 ! max size of rms_list & rms_chan_list
integer*2  rms_chan_tbl(MAX_RMS_TBL) ! list of discrete rms hs chan no
integer*2  rms_hs_locat(MAX_RMS_TBL) ! match rms chan no. to   ! hs chan no.

integer*2  burst_list(MAX_BURST_LIST) ! burst scan list
integer*2  burst_list_siz               ! no items in burst scan list
integer*2  no_burst_hs                  ! no burst hs channels
integer*2  max_burst_list               ! max size of burst_list & burst_chan_list
integer*2  burst_chan_tbl(MAX_BURST_TBL)
                                        ! list of discrete burst hs chan no
integer*2  burst_hs_locat(MAX_BURST_TBL) ! match burst chan no. to hs chan no.
integer*4  tpn
integer*4  zero_tpn
integer*4  tare_tpn
integer*2  run_no
integer*2  const_id
integer*2  const_set
integer*2  month
integer*2  day


   integer*2                            year
byte       time(8)
real*8     acq_str_tim                  ! time start hs acquisition
real*8     acq_stp_tim                  ! time stop hs acquisition
real*8     acq_init_tim                 ! time of first tpn of a group
character  data_mode*6                  ! tare or data mode
real*4     trdla                        ! tare
real*4     trdlb                        ! tare
real*4     trdlc                        ! tare
real*4     trdld                        ! tare
real*4     w                            ! tare
real*4     aw                           ! tare
```

```
  real*4      bw                ! tare
  character   comment*80        ! comment for tpn
  integer*4   no_read_loop      ! no reading per burst scan
  integer*4   tot_no_rdg        ! total no of reads for burst
  integer*4   no_loop_array     ! no of burst scans per HP3852 array
  integer*4   no_array          ! no of burst arrays max size
  integer*4   no_rem_loop       ! no of burst scans for last array
  integer*4   siz_array         ! size of max burst arrays
  integer*4   siz_lst_array     ! size of last burst array end structure
```

DATA_INFO_STR.FOR_INC

```
include     '[utilities]data_info.for_struct'

record      /data_info/     data
```

DATA_SYS_FLAG_STR.FOR_INC

```
structure /flag_type/
  logical*2     hs_on           ! used in scan_data
  logical*2     psi_on          ! used in scan_data
  logical*2     scani_on        ! used in scan_data
  logical*2     save_on_acqu    ! used in reduc_data
  logical*2     save_on_recall  ! used in reduc_data
  logical*2     pnt_screen      ! used in reduc_data
  logical*2     pnt_ln03        ! used in reduc_data
  logical*2     pnt_tbl_now     ! used in reduc_data
  logical*2     create_pnt_file ! used in reduc_data
  logical*2     output_pnt_file ! used in reduc_data

  logical*2     learn           ! used in data_sys_spec_fcn
  logical*2     plt_com_date    ! used in data_sys_spec_fcn
                                !     & sav_plot_dat
  logical*2     save_raw
  logical*2     disp_loop
  logical*2     data_loop
  logical*2     macro
  logical*2     rtn_disp
  logical*2     enable_IO
  logical*2     force_enable
```

```
  logical*2      force_zero
  logical*2      force_tare
  logical*2      force_const_id
  logical*2      force_comment
  logical*2      force_mod_param
  logical*2      use_cur_comm
  logical*2      use_rest_comm
  logical*2      acqu_mode
  logical*2      enbl_evt_flg
  logical*2      menu_on
  character*4    tran_mode
  logical*2      psi_cal_mode      ! PSI ESPs in calibration mode
  logical*2      aero_1            ! general purpose of aero
  logical*2      aero_2            ! general purpose of aero
  logical*2      fac_err           ! error detected, notify oper.
  character*4    pnt_style
  character*4    pnt_dev
  logical*2      run_auto_adv      ! auto advance run no.
  logical*2      remote_ready      ! remote system ready flag
  logical*2      diag_override     ! override data flag errors end structure

record /flag_type/     flg
```

FAC_CONF_STR.FOR_INC

```
structure /fac_conf/
    character   fac_id*10          ! facility, TGF, SARL, HWT
    character   device_name*6      ! IEEE-488 device name,_ixa0:,_ixa1:
    integer*2   hp_addr            ! 488 addr of HP3852
    integer*2   psi_addr           ! 488 addr of PSI 780 system
    integer*2   psi_84_addr        ! 488 addr of PSI 8400 system
    integer*4   kb_id              ! keyboard SMG id number
    integer*2   hs_slot            ! slot no of high speed D/A
    integer*2   hs_mux_slot        ! slot no of 1st hs mux
    integer*2   no_hs_mux          ! no of hs muxes
    integer*2   chan_hs_mux        ! chan per hs mux
    integer*4   no_hs_sampl        ! no samples per chan to take on hs
    integer*4   no_hs_burst_sampl  ! no hs samples per chan to take on burst
    integer*4   no_hs_scan         ! set to 1 for normal data, otherwise
                                   ! set to no. of times to scan burst chan list
      real*4    hs_scan_rate       ! set to 0  when no_scan = 1, otherwise
                                   ! set to number of sec. between burst scans
```

```
integer*4  no_disp_sampl      ! no samples per chan to take for display
integer*4  no_rms_sampl       ! no samples per chan to take for rms
integer*2  ct_slot            ! slot no of 1st counter card
integer*2  no_ct_cards        ! no of counter cards
integer*2  dg_out_slot        ! slot no. of dig. output, HP44724
integer*2  dg_in_slot         ! slot no. of dig. input, HP44721
integer*4  no_sv_sampl        ! no samples per scani chan
integer*2  no_sv_step         ! no scani steps
real*4     max_sv_delay       ! max delay between scani steps, sec.
real*4     sv_delay           ! delay between scani tolerance checks,sec.
integer*2  chan_bal           ! channel no. of balance
integer*2  no_dg_chan         ! no of digital channels to store with data
integer*2  no_ms              ! no of ms chan to store with data
real*4     hs_rate            ! SPER hs rate in seconds
real*4     disp_rate          ! SPER display rate in seconds
real*4     rms_rate           ! SPER rms rate in seconds
real*4     hs_burst_rate      ! SPER hs burst rate in seconds
real*4     sv_rate            ! SPER sv rate in seconds
integer*2  psi_cal_rate       ! seconds per cal step for psi 780 system
integer*2  psi_a1             ! no of psi chan. on cal. one
integer*2  psi_a2             ! no of psi chan. on cal. two
integer*2  psi_a3             ! no of psi chan. on cal. three
byte       psi_g              ! largest no. of trans. on one module
integer*2  psi_no_mod         ! no of contiguous mod. to scan
integer*2  psi_no_mod_cal(3)  ! no of contiguous mod. per cal range
integer*2  psi_no_tran(32)    ! no of trans per mod.
integer*2  psi_no_78_chan     ! no of PSI 780 channels used.
integer*2  psi_no_scan        ! total no of psi chan scanned.
integer*2  psi_no_chan        ! total no of channels used, 8400 + 780
integer*2  psi_84_cal_rate    ! seconds per cal step for psi 8400 system
integer*2  psi_sdu(2)         ! CRS's of SDU's
integer*2  psi_pcu(4)         ! CRS's of PCU's
integer*2  psi_aiu(6)         ! CRS's of AIU's
real*4     psi_cal_pres(3,5)  ! calibration press. for ranges 1-3
integer*2  psi_mod_addr(3,10) ! addr of moduals using ranges 1-3

integer*2  psi_ports_mod(3,10) ! no. of ports per mod. for each range
real*4     aiu_range(6)       ! range of each PSI AIU
integer*2  psi_no_pres        ! no of press. channels read from psi 8400
integer*2  psi_no_volt        ! no of volt channels read from psi 8400
integer*2  no_mod_84(3)       ! no of pressures modules per range for psi 8400
integer*2  no_anal_84         ! no of analog modules for psi 8400
integer*2  no_psi_burst_sampl ! no. samples to average per burst TPN
integer*2  no_psi_scan        ! no of scan for psi burst
```

```
    real*4      psi_burst_rate      ! micro sec for A/D sample rate
    real*4      psi_scan_rate       ! mil sec between scans for psi burst
    logical*2   use_hs              ! use hs high speed system
    logical*2   use_hs_burst        ! use hs burst data mode
    logical*2   use_psi_burst       ! use psi burst data mode
    logical*2   hs_ext_trig         ! external trig on for hs burst data mode
    logical*2   psi_ext_trig        ! external trig on for psi burst data mode
    logical*2   use_psi             ! use PSI 780 system
    logical*2   use_84_psi          ! use PSI 8400 system
    logical*2   reduc_psi           ! reduce data from PSI system
    logical*2   use_sv              ! use scani valve system
    logical*2   use_rms             ! use rms hs channels

    logical*2   use_que             ! use circular queue
    logical*2   input_only          ! read inputs only mode
    integer*2   no_gen_items        ! no of bytes of general data in
                                    !  raw_data record, for raw_data_specification
    character   file_nam_menu*40
    character   dat_fil_nam*40
    character   zero_fil_nam*40
    character   const_fil_nam*40
    character   status_fil_nam*40
    character   fil_nam_fac_conf*40
    character   fil_nam_manual_dat*40
    character   display_fil_nam*40
    character   que_fil_nam*40
    character   raw_spec_fil_nam*40
    character   sav_cal_fil_nam*40
end structure

record  /fac_conf/                  fac

structure /lun_type/
    integer*4   stat
    integer*4   dat
    integer*4   zero
    integer*4   macro
    integer*4   que
    integer*4   gen
    integer*4   pnt
    integer*4   save
end structure
```

MENU_INTERFACE.INC

```
*=============================================================================*
    USED BY PROGRAMS CALLING SUBROUTINE MENU_REQUEST.FOR
*=============================================================================*
```

C CONSTRAINTS

```
      parameter PD_MAX_CHOICE_LEN=30! Max. no. char. per menu item.
      parameter PD_MAX_CHOICES=10! Max no. items per bar or screen list.
      parameter SUB_MAX_CHOICES=50! Max no. items per actual list.
      character
     .    choice*(2*PD_MAX_CHOICE_LEN+1),  ! Column & item name
                                           ! selected, joined by a '-'.
     .    p_message*80              ! Message to be printed.
      logical   finished             ! Main loop continue flag.
```

MENU_SUFX_STR.FOR_INC

```
      structure /str_sufx/
          character*25   pnt_fcn
          character*25   pnt_dev
          character*25   hs_fcn
          character*25   scani_fcn
          character*25   psi_fcn
          character*25   save_fcn
          character*25   plt_dev
          character*25   tran_mode
          character*25   psi_mode
          character*25   remote_sync
          character*25   run_number
      end structure
      record /str_sufx/  menu_sufx
```

PARA_POINTER.FOR_INC

```
      integer*2
     2 TPN,
     2 ZTPN,
     2 CONST_ID,
     2 MACH,
     2 P0_TGF,
     2 P0_TGF_PSI,
     2 P0_M6,
     2 VTS,
     2 VEL,
     2 RN,
     2 TARE_TPN,
     2 TSTS,
     2 TS,
     2 A,
     2 RUN_NO,
     2 RE,
     2 Q_TGF,
     2 Q_450,
     2 Q_SARL,
     2 ALPHA_DEF,
     2 SAMPL_DEL,          ! hs sample time delta
     2 SAMPL_STR,
     2 RUN_DEL,            ! timed loop time delta
     2 PS_20,
     2 PS_6,
     2 PS_TGF,
     2 PS_TGF_PSI,
     2 PMANF_20,           ! manifold pressure in microns, 20"HWT
     2 PSTS,
c    2 V_COR,
c    2 Q_COR,
c    2 RN_COR,
     2 X_AXIS,             ! probe x axis position
     2 Y_AXIS,             ! probe y axis position
     2 Z_AXIS,             ! probe z axis position
     2 X_AXIS_SET,         ! probe x axis position manual set
     2 Y_AXIS_SET,         ! probe y axis position manual set
     2 Z_AXIS_SET,         ! probe z axis position manual set
     2 NF_C,
     2 SF_C,
```

```
2 AF_C,
2 PM_C,
2 YM_C,
2 RM_C,
2 NF_T,
2 SF_T,
2 AF_T,
2 PM_T,
2 YM_T,
2 RM_T,
2 NFB,
2 PMOMB,
2 SFB,
2 YMOMB,
2 RMOMB,
2 AXFB,
2 NORM_DEF,
2 SIDE_DEF,
2 ROLL_DEF,

2 P0IN,
2 P0,
2 P0_M6_HIGH,
2 PWAL,
2 NOZ_STAT,
2 PS,
2 PMANV_20,          ! manifold pressure in volts in 20"HWT
2 T0,
2 Q_SARL_PITO,
2 TC_BAL,
2 PBASE_450,         ! Model base pressure for 450 facilities
2 BASE_1,
2 P0TS,
2 BASE_2,
2 PSTS_MEAS,
2 T0IN,
2 PITCH_STING,
2 P0_M6_LOW,

2 MACH_20,
2 MACH_6,
2 ROLL_ANG,
2 PATM,
2 PREF,
```

```
c     2 RUN_NUMBER,
      2 PORT,
      2 FREE_JET_LENGTH,
      2 LOOP_TIME,              ! TIME OF LOOP IN DISPLAY MODE
      2 NOSER,                  ! PART OF BMO TEST PARAMETERS
      2 FLAPA,                  ! PART OF BMO TEST PARAMETERS
      2 FLAP_ID,                ! PART OF BMO TEST PARAMETERS
      2 BOAT_TAIL,              ! PART OF BMO TEST PARAMETERS
      2 GUID_VANE_TGF           ! location of first tgf compressor vane
      parameter          (TPN = DERIVED_OFFSET + 1)
      parameter          (ZTPN = DERIVED_OFFSET + 2)
      parameter          (CONST_ID = DERIVED_OFFSET + 3)
      parameter          (MACH = DERIVED_OFFSET + 4)
      parameter          (P0_TGF = DERIVED_OFFSET + 5)
      parameter          (P0_M6 = DERIVED_OFFSET + 5)
      parameter          (VTS = DERIVED_OFFSET + 6)
      parameter          (VEL = DERIVED_OFFSET + 6)
      parameter          (RN = DERIVED_OFFSET + 7)
      parameter          (TARE_TPN = DERIVED_OFFSET + 8)
      parameter          (TSTS = DERIVED_OFFSET + 9)
      parameter          (TS = DERIVED_OFFSET + 10)
      parameter          (A = DERIVED_OFFSET + 11)
      parameter          (RUN_NO = DERIVED_OFFSET + 12)
      parameter          (RE = DERIVED_OFFSET + 13)
      parameter          (Q_TGF = DERIVED_OFFSET + 14)
      parameter          (Q_450 = DERIVED_OFFSET + 14)
      parameter          (Q_SARL = DERIVED_OFFSET + 14)
      parameter          (ALPHA_DEF = DERIVED_OFFSET + 15)
      parameter          (SAMPL_DEL = DERIVED_OFFSET + 16)
      parameter          (SAMPL_STR = DERIVED_OFFSET + 17)
      parameter          (RUN_DEL = DERIVED_OFFSET + 18)
      parameter          (PS_20 = DERIVED_OFFSET + 19)
      parameter          (PS_6 = DERIVED_OFFSET + 19)
      parameter          (PS_TGF = DERIVED_OFFSET + 19)
      parameter          (PMANF_20 = DERIVED_OFFSET + 20)
      parameter          (PSTS = DERIVED_OFFSET + 22)
c     parameter          (V_COR = DERIVED_OFFSET + 22)
c     parameter          (Q_COR = DERIVED_OFFSET + 23)
c     parameter          (RN_COR = DERIVED_OFFSET + 24)
      parameter          (P0_TGF_PSI = DERIVED_OFFSET + 25)
      parameter          (PS_TGF_PSI = DERIVED_OFFSET + 26)
      parameter          (X_AXIS = DERIVED_OFFSET + 30)
      parameter          (Y_AXIS = DERIVED_OFFSET + 31)
      parameter          (Z_AXIS = DERIVED_OFFSET + 32)
```

```
      parameter     (NF_C = DERIVED_OFFSET + 189)
      parameter     (SF_C = DERIVED_OFFSET + 190)
      parameter     (AF_C = DERIVED_OFFSET + 191)
      parameter     (PM_C = DERIVED_OFFSET + 192)
      parameter     (YM_C = DERIVED_OFFSET + 193)
      parameter     (RM_C = DERIVED_OFFSET + 194)
      parameter     (NF_T = DERIVED_OFFSET + 195)
      parameter     (SF_T = DERIVED_OFFSET + 196)
      parameter     (AF_T = DERIVED_OFFSET + 197)
      parameter     (PM_T = DERIVED_OFFSET + 198)
      parameter     (YM_T = DERIVED_OFFSET + 199)
      parameter     (RM_T = DERIVED_OFFSET + 200)
      parameter     (NFB = DERIVED_OFFSET + 201)
      parameter     (PMOMB = DERIVED_OFFSET + 202)
      parameter     (SFB = DERIVED_OFFSET + 203)
      parameter     (YMOMB = DERIVED_OFFSET + 204)
      parameter     (RMOMB = DERIVED_OFFSET + 205)
      parameter     (AXFB = DERIVED_OFFSET + 206)
      parameter     (NORM_DEF = DERIVED_OFFSET + 207)
      parameter     (SIDE_DEF = DERIVED_OFFSET + 208)
      parameter     (ROLL_DEF = DERIVED_OFFSET + 209)

      parameter     (P0IN = HS_OFFSET + 1)
      parameter     (P0 = HS_OFFSET + 1)
      parameter     (P0_M6_HIGH = HS_OFFSET + 1)
      parameter     (PWAL = HS_OFFSET + 2)
      parameter     (PS = HS_OFFSET + 2)
      parameter     (NOZ_STAT = HS_OFFSET + 2)
      parameter     (T0 = HS_OFFSET + 3)
      parameter     (PITCH_STING = HS_OFFSET + 4)
      parameter     (P0_M6_LOW = HS_OFFSET + 4)
      parameter     (PMANV_20 = HS_OFFSET + 5)
      parameter     (PBASE_450 = HS_OFFSET + 7)
      parameter     (Q_SARL_PITO = HS_OFFSET + 11)
      parameter     (TC_BAL = HS_OFFSET + 11)
      parameter     (BASE_1 = HS_OFFSET + 12)
      parameter     (P0TS = HS_OFFSET + 12)
      parameter     (BASE_2 = HS_OFFSET + 13)
      parameter     (PSTS_MEAS = HS_OFFSET + 13)
c     parameter     (GUID_VANE_TGF = HS_OFFSET + 21)
      parameter     (GUID_VANE_TGF = HS_OFFSET + 29)
c     parameter     (T0IN = HS_OFFSET + 69)
      parameter     (T0IN = HS_OFFSET + 93)
```

```
      parameter       (PATM = MS_OFFSET + 1)
      parameter       (PREF = MS_OFFSET + 1)
      parameter       (MACH_20 = MS_OFFSET + 2)
      parameter       (MACH_6 = MS_OFFSET + 2)
c     parameter       (RUN_NUMBER = MS_OFFSET + 3)
      parameter       (ROLL_ANG = MS_OFFSET + 4)
      parameter       (NOSER = MS_OFFSET + 5)
      parameter       (FLAPA = MS_OFFSET + 6)
      parameter       (BOAT_TAIL = MS_OFFSET + 7)
      parameter       (PORT = MS_OFFSET + 8)
      parameter       (FLAP_ID = MS_OFFSET + 9)
      parameter       (FREE_JET_LENGTH = MS_OFFSET + 10)
      parameter       (LOOP_TIME = MS_OFFSET + 15)
      parameter       (X_AXIS_SET = MS_OFFSET + 16)
      parameter       (Y_AXIS_SET = MS_OFFSET + 17)
      parameter       (Z_AXIS_SET = MS_OFFSET + 18)


      integer*2       ! aero force and moment parameters
     2 DBASE,         ! base drag due to base pressure,lbf
     2 CPBASE,        ! base pressure coeficient
     2 DPBASE,        ! delta p on base pressure transducer,psf
     2 CNB,                    ! coef of normal force body axis
     2 CYB,                    ! coef of side force body axis
     2 CAB,                    ! coef of axial force body axis
     2 CPMB,          ! coef of pitching moment body axis
     2 CYMB,          ! coef of yawing moment body axis
     2 CRMB,          ! coef of rolling moment body axis
     2 CLW,                    ! coef of lift wind axis
     2 CYW,                    ! coef of side force wind axis
     2 CDW,                    ! coef of drag wind axis
     2 CPMW,          ! coef of pitch moment wind axis
     2 CYMW,          ! coef of yaw moment wind axis
     2 CRMW,          ! coef of row moment wind axis
     2 CLS,                    ! coef of lift stability axis
     2 CYS,                    ! coef of side force stability axis
     2 CDS,                    ! coef of drag stability axis
     2 CPMS,          ! coef of pitching moment stability axis
     2 CYMS,          ! coef of yawing moment  stability axis
     2 CRMS,          ! coef of rolling moment stability axis
     2 alpha,         ! corrected alpha, def., roll, etc
     2 psi,                    ! corrected yaw
     2 beta                    ! corrected -yaw = -psi
```

```
parameter       (CNB = DERIVED_OFFSET + 301)
parameter       (CYB = DERIVED_OFFSET + 302)
parameter       (CAB = DERIVED_OFFSET + 303)
parameter       (CPMB = DERIVED_OFFSET + 304)
parameter       (CYMB = DERIVED_OFFSET + 305)
parameter       (CRMB = DERIVED_OFFSET + 306)
parameter       (CLS = DERIVED_OFFSET + 307)
parameter       (CYS = DERIVED_OFFSET + 308)
parameter       (CDS = DERIVED_OFFSET + 309)
parameter       (CPMS = DERIVED_OFFSET + 310)
parameter       (CYMS = DERIVED_OFFSET + 311)
parameter       (CRMS = DERIVED_OFFSET + 312)
parameter       (DPBASE = DERIVED_OFFSET + 313)
parameter       (CPBASE = DERIVED_OFFSET + 314)
parameter       (DBASE = DERIVED_OFFSET + 315)
parameter       (CLW = DERIVED_OFFSET + 316)
parameter       (CYW = DERIVED_OFFSET + 317)
parameter       (CDW = DERIVED_OFFSET + 318)
parameter       (CPMW = DERIVED_OFFSET + 319)
parameter       (CYMW = DERIVED_OFFSET + 320)
parameter       (CRMW = DERIVED_OFFSET + 321)
parameter       (ALPHA = DERIVED_OFFSET + 324)
parameter       (PSI = DERIVED_OFFSET + 325)
parameter       (BETA = DERIVED_OFFSET + 350)
```

PLOT_UTIL_SUBS.FOR_INC

```
c                                   plot_util_subs.for_inc

      include '[utilities]plot_util_subs.for_struct'

      record /plot_info/
      2  plt(4)

      record /anot_info/
      2  anot

      record /spec_info/
      2  spec
```

PLOT_UTIL_SUBS.FOR_STRUCT

```
integer*4
2  PLOT_DATA_SIZE

integer*2
2  MAX_X_Y,
2  MAX_PNT

parameter (PLOT_DATA_SIZE = 65000)
parameter (MAX_X_Y = 3000)
parameter (MAX_PNT = 500)

structure /plot_info/              ! This structure is required for each axis
    integer*2       no_data_sets     ! no. of data sets (group of TPNs),
                                     !     set by prog. calling plt_it,
    integer*2       no_defined_cur   ! no. of curves defined in *.axis
    integer*2       no_tpn_set(10)   ! no. of TPNs per data set
    integer*2       no_defined_pnt_cur(10) ! no of X-Y pairs defined in *.axis per curve
    integer*2       data_set(10)     ! data set curve is to used for; if 0, use for
                                     !all data sets; if >0 use only for that
                                     !data set, defined in *.axis per curve
    integer*2       no_pnt_cur(10)   ! no. points per curve,
                                     !     calculated in plt_it if auto_no_pnt T
    integer*2       str_pnt_cur(10)  ! relative start TPN for curve,
                                     !     cal in plt_it if auto_no_pnt T
    logical*2       auto_no_pnt      ! if true, calculate no. pnts per curve in plt_it
    logical*2       auto_sym         ! if true, init symboles in read_plot_des
    integer*2       start_symb       ! symbol of first curve for auto_sym true
    logical         plot_info_read
    integer*4       no_cur_axis      ! no. curves on axis, calculate in plt_it
    integer*2       use_descript(10) ! curve descrip. to use, set by plt_it
    integer*4       symb(10)         ! symbols to use
    logical*2       line_on          ! used to determine mark_conect
    logical*2       symbol_on        ! used to determine mark_conect
    integer*4       mark_conect      ! >0 connect sym, =0 line, <0 sym not connected
    character*8     name_x(30,10)    ! name of X axis items to plot
    character*8     name_y(30,10)    ! name of Y axis items to plot
    integer*4       pnt_x(30,10)     ! pointer to item, given values in read_plot_des
    integer*4       pnt_y(30,10)     ! pointer to item, given values in read_plot_des
    integer*2       no_rows          ! = MAX_X_Y / no_cur, given value in plt_it
    real*4          x(MAX_X_Y)       ! x data to plot, given values in plt_it
    real*4          y(MAX_X_Y)       ! y data to plot, given values in plt_it
```

```
      real*4          max_x
      real*4          min_x
      real*4          max_y
      real*4          min_y
      real*4          step_x          ! major grid lines
      real*4          step_y
      integer*4       tick_x          ! no. lines to next
      integer*4       tick_y          !    major division.
      integer*4       dash_x          ! no of dashed lines to
      integer*4       dash_y          !    next tick.
      character*60    x_lab
      character*60    y_lab
      character*30    comment
    end structure

c   field name changes 27 May, 91
c             old                       new
c   manual_no_cur_tpn           no_data_sets
c   no_cur_tpn                  no_defined_cur
c   no_pnt_cur_tpn              no_defined_pnt_cur
c   no_cur                      no_cur_axis

    structure /anot_info/               ! This structure is required for each page
      integer*2     no_plt_des          ! no plot items in plot_data
      integer*2     no_sour_des         ! no plot items form para_des...
      integer*2     para_sym(24)        ! curve sym. and curve no. for annot.
      integer*4     no_format           ! no. annot. formats
      character*8   name_anot_1(24)     ! name of 1st item for a anot
      character*8   name_anot_2(24)     ! name of 2nd item for a anot
      integer*4     pnt_item_fst(24)    ! possition of 1st item for annot.
      integer*4     pnt_item_lst(24)    ! possition of last (2nd) item for annot.
      integer*4     pnt_cur_fst(24)     ! 1st TPN for annot. relative to curve
      integer*4     pnt_cur_lst(24)     ! last TPN for annot. relative to curve, set to
                                        !    9999 to use last pnt of curve.
      integer*4     para_nam(7,24)      ! anot messages
      character*40  para_format(24)
      character*60  tit_lab
    end structure

    structure /spec_info/               ! This structure is required for each page
      character*4   fac_id
      character*5   form_id
      character*6   output_dev
      character*40  file_nam
```

```
      integer*2       no_axis
      integer*2       no_plt_des      ! no_sour_des + no. items ! after *NEW* in plot_data.
      integer*2       no_sour_des     ! no items before *NEW* in
                                      ! plot_data.descript
      end structure

      structure /name_pointer/
      character*8     name
      integer*2       page
      integer*2       line
      integer*2       column
      character*2     device
      integer*2       chan
      integer*2       test_loc
      logical*2       plt_disp
      end structure

      structure /plt_stat_str/
      integer*2       cur_id
      integer*2       cur_pag
      integer*2       cur_axis
      integer*2       cur_curv
      integer*2       cur_pnt
      integer*4       unit_stat
      integer*4       unit_plt
      integer*2       pag_id(10)
      logical*2       saved(10)
      integer*2       id_pag(99)
      integer*2       column
      integer*2       row
      integer*2       anot_no
      end structure

c     used by aero plot "not current"
c           plot_info : no_cur, no_pnt_cur(), symb(), tick_x, tick_y, x, y,
c                 max_x, min_x, max_y, min_y, step_x, step_y, x_lab, y_lab
c           anot_info : para_sym(), para_nam(,), tit_lab
c           spec_info : fac_id, form_id, no_axis

      structure /disp_info/
      integer*2       loc(14,10)
      character*10    title(14,10)
      character*40    format(14,10)
      end structure
```

PNT_TBL.FOR_STRUCT

```
      integer*2
     2  MAX_NO_TBL_PAGE,     ! max no of pages for table layout
     2  MAX_ALL_LAB,         ! max no labels used for each page
     2  MAX_PAG_LAB,         ! max no labels for current page
     2  MAX_HORZ_RGT,        ! max no columns for horz table
     2  MAX_HORZ_DWN,        ! max no rows for horz table
     2  MAX_VERT_RGT,        ! max no columns for vert table
     2  MAX_VERT_DWN         ! max no rows for vert table

      parameter      (MAX_NO_TBL_PAGE = 20)
      parameter      (MAX_ALL_LAB = 10)
      parameter      (MAX_PAG_LAB = 4)
      parameter      (MAX_HORZ_RGT = 8)
      parameter      (MAX_HORZ_DWN = 61)
c     parameter      (MAX_VERT_RGT = 11)
      parameter      (MAX_VERT_RGT = 10)
      parameter      (MAX_VERT_DWN = 45)

      structure /page_type/
        integer*2        test_para_point(MAX_VERT_DWN)
        character*106    lab(MAX_PAG_LAB)
        integer*2        no_lab      ! no labs for current page
        integer*2        no_para     ! no of parameters per page
        union
          map
            real*4       data_horz(MAX_HORZ_RGT, MAX_HORZ_DWN)
          end map
          map
            real*4       data_vert(MAX_VERT_DWN, MAX_VERT_RGT)
          end map
        end union
      end structure

      structure /tbl_type/
        record  /page_type/  page(MAX_NO_TBL_PAGE)
        character*106 all_lab(MAX_ALL_LAB)
        character*80  comment(MAX_HORZ_DWN)
        integer*2        no_all_lab     ! no lab for each table page
        integer*2        no_tpn_page    ! no tpn's currently on page of table
        integer*2        no_page        ! no pages wide table is
        integer*2        page_cnt       ! page counter for number printout
      end structure
```

PNT_TBL_STR.FOR_INC

```
include     '[utilities]pnt_tbl.for_struct'

record      /tbl_type/ tbl
```

REDUC_DATA.FOR_STRUCT

```
integer*2
2  NO_HS_CHAN,
2  NO_HR_CHAN,
2  NO_PSI_CHAN,
2  NO_DIG_CHAN,
2  NO_SV_CHAN,
2  NO_MS_CHAN,
2  MAX_HED,              ! Max no. of items in heading.
2  PSI_OFFSET,           ! Offset to beginning of data from psi system.
2  HS_OFFSET,            ! Offset to beginning of hp high speed data.
2  DERIVED_OFFSET,       ! Offset to beginning of derived data.
2  HR_OFFSET,            ! Offset to high resolution data.
2  DIG_OFFSET,           ! Offset to beginning of digital input data.
2  SV_OFFSET,            ! Offset to beginning of scani data.
2  MS_OFFSET,            ! Offset to beginning of manual set data.
2  MAX_NO_PAGES,         ! Max no. of pagers to print per tpn.
2  MAX_NO_LINES,         ! Max no. of lines to be printed out.
2  MAX_NO_COL,           ! Max no. of columns to printed per line.
2  MAX_TEST_PARA         ! Max size of array test_para

parameter                (NO_HS_CHAN = 120)
parameter                (NO_HR_CHAN = 20)
parameter                (NO_PSI_CHAN = 400)
parameter                (NO_DIG_CHAN = 66)
parameter                (NO_SV_CHAN = 420)
parameter                (NO_MS_CHAN = 50)

parameter                (HS_OFFSET = 0)
parameter                (HR_OFFSET = HS_OFFSET + NO_HS_CHAN)
parameter                (PSI_OFFSET = HR_OFFSET + NO_HR_CHAN)
parameter                (DIG_OFFSET = PSI_OFFSET + NO_PSI_CHAN)
parameter                (SV_OFFSET = DIG_OFFSET + NO_DIG_CHAN)
parameter                (MS_OFFSET = SV_OFFSET + NO_SV_CHAN)
```

```
parameter                (DERIVED_OFFSET = MS_OFFSET + NO_MS_CHAN)

parameter                (MAX_NO_PAGES = 7)
parameter                (MAX_NO_LINES = 66)
parameter                (MAX_NO_COL = 8)
parameter                (MAX_TEST_PARA = MAX_NO_PAGES *
2                              MAX_NO_LINES * MAX_NO_COL)
parameter                (MAX_HED = 50)

structure /para_type/
  character*8    id_name
  character*8    units
  real*4         value
  character*2    device
  character*20   pnt_form
end structure

structure /print_type/
  integer*2   order(0:MAX_NO_PAGES, 0:MAX_NO_LINES, 0:MAX_NO_COL)
  logical*2   heading(0:MAX_NO_PAGES, 0:MAX_NO_LINES)
  integer*2   last_col(MAX_NO_PAGES, MAX_NO_LINES)
  integer*2   last_line(MAX_NO_PAGES)
  integer*2   last_page
end structure
```

REDUC_DATA_STR.FOR_INC

```
include '[utilities]reduc_data.for_struct'

record /para_type/
2  test_para(MAX_TEST_PARA)

record /print_type/ print


c                              Usage of DR array

c    1          TPN
c    2          ZTPN
c    3          CONST_ID
c    4          MACH
```

```
c    5        P0_TGF
c    6        VTS             VEL
c    7        RN
c    8        TARE_TPN
c    9        TSTS
c    10       TS
c    11       A
c    12
c    13       RE
c    14       Q_TGF           Q_450Q_SARL
c    15       ALPHA_DEF
c    16       SAMPL_DEL
c    17       SAMPL_STR
c    18       RUN_DEL
c    19       PS_20           PS_6PS_TGF
c    20       PMANF_20
c    21       PREF
c    22       V_COR
c    23       Q_COR
c    24       RN_COR
c    25
c    26
c    27
c    28
c    29
c    30       X_AXIS
c    31       Y_AXIS
c    32       Z_AXIS
c    33
c    34
c    35



c    189      NF_C
c    190      SF_C
c    191      AF_C
c    192      PM_C
c    193      YM_C
c    194      RM_C
c    195      NF_T
c    196      SF_T
c    197      AF_T
```

```
c   198     PM_T
c   199     YM_T
c   200     RM_T
c   201     NFB
c   202     PMOMB
c   203     SFB
c   204     YMOMB
c   205     RMOMB
c   206     AXFB            TFB
c   207     NORM_DEF
c   208     SIDE_DEF
c   209     ROOL_DEF


c   301     CNB
c   302     CSB
c   303     CTB
c   304     CMY
c   305     CMZ
c   306     CMX
c   307     CLS
c   308     CYS
c   309     CDS
c   310     CMS
c   311     CNS
c   312     CLSS            CLLS
c   313     DPBASE
c   314     CPBASE
c   315     DBASE
c   316
c   317
c   318
c   319
c   320
c   321
c   322
c   323
c   324     ALPHA
c   325     PSI
c   326
c   327
c   328
c   329
```

```
c    350        BETA


c    601        data derived form psi, sarl fan rake ratio
c     .
c     .
c     .
c     .
c    800        data derived form psi


c    801        other data derived from psi, sarl fan rake averages
c     .
c     .
c     .
c     .
c    900        other data derived from psi
```

APPENDIX D: SAMPLE DATA OUTPUTS

This appendix includes samples of the data output. There are samples of each of the printed data styles. These formats are page style, horizontal style, and vertical style. There are also samples of two-dimensional data plots. Any of these outputs are available, parameter names are defined, and the position each parameter appears on the page is controlled without making any changes to the program. The printing is controlled via data files "para_descript.txt" and "table_descript.txt" and they are modified using a text editor. The plots are controlled via data files "plt_*.axis" (* is 1 through 99) and they are modified by functions in the drop down menu of menu bar axis. The examples that follow are actual outputs from real tests, and as such no comments explaining them are on any of the pages, thus they will be discussed here indirectly. For a description of how to set these outputs up, see the sections titled DATA PRINTING and DATA PLOTTING in the main body of this document. See the descriptions of files PARA_DESCRIPT.TXT, PLT_*.AXIS, and TABLE_DESCRIPT.TXT in appendix A and examples of each in appendix B.

The first set of examples are in page style. There are three examples. The first example is one page long (p 97), and in the upper right-hand corner has printed "page (id= 1) 1 of 1". The "id= 1" is the identification number that relates a particular page to a page description in file para_descript.txt. In the syntax "1 of 1" the last "1" indicates how many pages where printed out for this printing and the first "1" indicates which page of the x pages this page is. This is useful because up to seven pages can be defined, but it is not necessary to print all pages each time data are printed out. As an example, if five pages are defined and only pages with identification numbers two and four are printed out, then only two pages would be printed. The

upper right-hand corner of the first page printed would have "page (id= 2) 1 of 2" and the second page would have " id= 4) 2 of 2". The second example is three pages long (pp 98-100), and the third example is six pages long (pp 101-106). These outputs where solely defined by data in the file "para_descript.txt".

Both table styles have the following in common. In table output style, it is possible for the table size to exceed the physical size of the page. When this happens, the table is printed on multiple pages with a numbering system in the upper right-hand corner that identifies which part of the larger logical table the physical page is. The identifier has the format "Page 2-3" where the "2" is the page row number and the "3" is the page column number.

The second set of examples are in horizontal table style. In horizontal style the parameters go across the page and test points go down the page. The output is placed on the physical page in portrait mode. There are two examples in this set. The first example consists of three pages (pp 107-109) and is three pages wide and one page high. The second example consists of four pages (pp 110-113) and is one page wide and four pages high. Although there is no example, the table can be expanded simultaneously in both directions.

The third set of examples are in vertical table style. In vertical style the parameters go down the page and test points go across the page. The output is placed on the physical page in landscape mode. There are two examples in this set. The first example consists of two pages (pp 114-115) and is one page wide and two pages high. The second example consists of three pages (pp 116-118) and is three pages wide and one page high. Although there is no example, the table can be expanded simultaneously in both directions.

The fourth set of examples are plots. There are four coordinate layouts to select from.

Each layout fills most of the page but leaves room for a title and annotations at the top of the page. The available layouts are whole page, half page, tri page, and quad page. The whole page layout has one coordinate per page and the first two examples (p 119 & p 120) are this type of plot. The half page layout uses half of the page (divided horizontally) for each of up to two coordinates per page, there is no example of this included. The tri page layout has up to three coordinates per page. Each coordinate is the width of the page and about one-third the height of the page. There are two examples (p 121 & p 122) of tri page layout. The quad page layout has up to four coordinates per page. Each coordinate is half the width and about half the height of the page. There is one example (p 123) of quad page layout.

Trisonic Gasdynamics Facility
Air Force Wright Aeronautical Laboratory
WPAFB, Ohio
Project : F16 FOREBODY BLOWING TEST
Taken on 3/12/93 at 13:40:38 and Printed on 3/16/93 at 14:38:07
Nozz Dia. = 1/8 Posit. 1A @-60 deg. Short Boom

CONTROL PARAMETER

TPN	ZTPN	Constant	Mod_bal deg	Atm psia	Roll ang Deg	Prebend Deg	Anozz aera
1619.	1618.	1.	90.00	14.38	-90.00	30.00	.000085

BLOWING CONDITION

Flow T deg R	Supply psia		Del_P psia	Orf dia inch	Orf ID chan.	Mdot Lbm/sec	Del_PII psia
531.28	5.62		5.62	0.16	11.00	0.0002	5.61

TEST CONDITIONS

MACH	Q psf	P0 psfa	PS psfa	T0 deg R	T deg R	VEL Ft/Sec	RN
0.403	102.41	1009.35	902.72	534.56	517.77	449.	0.12216E+07

Pitch deg	C_Pitch deg	Alpha deg	Beta deg		Norm def deg	Side def deg	Roll def deg
0.01	30.01	30.11	-0.20		0.11	0.25	0.06

BALANCE DATA

N1 volts	N2 volts	Y1 volts	Y2 volts	Roll volts	Axial volts
-0.000695	-0.000389	0.000770	-0.000161	0.000227	0.000091

NF lbs	PM in-lb	SF lbs	YM in-lb	RM in-lb	AXIAL lbs
3.08	5.33	10.73	3.85	2.73	0.95

NF_C lbs	PM_C in-lb	SF_C lbs	YM_C in-lb	RM_C in-lb	AF_C lbs
3.08	5.70	10.73	4.58	2.73	0.95

NF_T lbs	PM_T in-lb	SF_T lbs	YM_T in-lb	RM_T in-lb	AF_T lbs
13.81	159.96	-0.01	2.24	-1.21	1.00

w	aw	bw	trdld	trdlb	trdla
10.74	2.25	3.92	Roll	0.	Down

PLENUM PRESSURES

Pplen_L psi	Tplen_L deg R	Pplen_R psi	Tplen_R deg R
5.79	620.41	6.31	585.59

NOZZLE BLOWING COEFFICIENTS

Left_Cmu	Right_Cm	Cq
0.0005	0.0005	0.0003

Body Axis Coeficients

CNB	CPMB	CYB	CYMB	CRMB	CAB
0.1248	0.1775	-0.0001	0.0009	-0.0005	0.0090

Trisonic Gasdynamics Facility
Air Force Wright Aeronautical Laboratory
WPAFB, Ohio
Project : MAIBL
Taken on 10/28/92 at 13:33:42 and Printed on 3/16/93 at 08:01:51
MFP Sweep Diverter .1

Control Parameter

TPN	ZTPN	Constant	Run no	Atm psia		P0_2 psi	PS_2 psi
619.	598.	3.	70.	14.35		4.9794	1.8113

Test Conditions

MACH	Q psf	P0 psfa	PS psfa	T0 deg R	T deg R	VEL Ft/Sec	RN
1.294	305.82	717.03	260.83	509.28	381.48	1239.	0.16927E+07

Mass flow information

Jet temp deg R	Jet sup psia	Jet dwn psia		Orf dm J inch		W Jet Lbm/sec	
486.10	6.93	6.90		0.422		0.0020	
Bump tem deg R	**Bump sp psia**	**Bump dwn psia**	**up_bump psia**	**Orf dm B inch**	**dn_bump psia**	**W Bump Lbm/sec**	
550.81	1.90	0.88	1.98	1.690	1.18	0.1114	
Dvrt tem deg R	**Dvrt sp psia**	**Dvrt dwn psia**	**up_dvrt psia**	**Orf dm D inch**	**dn_dvrt psia**	**W Divrt Lbm/sec**	
550.56	2.92	2.88	2.93	2.010	2.89	0.1009	

Model conditions

TWP1 deg R	TWP2 deg R	TWP3 deg R	TWP4 deg R	TTOJ deg R
560.30	558.87	558.40	554.40	536.71

MF_Pos inch	Rake_0 Deg	Rake_45 Deg	Boundary rake	Model Id nomencla	Bump nomencla	Cowl nomencla	Inlet Pos.
3.00	2.05	43.68	N/A	PD1	B4	CWL1	FWD

ESP monitor pressures (psi)

ESP 2-32	ESP 3-32	ESP 4-31	ESP 6-27	ESP 7-3
11.7895	11.9006	6.0278	14.2447	14.2560

Kulites (psi) at 0 deg.				Kulites (psi) at 45 deg.			
PDEFT1	PDEFT2	PDEFT3	PDEFT4	PDEFT1B	PDEFT2B	PDEFT3B	PDEFT4B
0.2638	0.2876	0.1924	0.2376	0.2550	0.2694	0.2180	0.2626
PDEFT5	PDEFT6	PDEFT7	PDEFT8	PDEFT5B	PDEFT6B	PDEFT7B	PDEFT8B
0.2374	0.2179	0.0001	0.1852	0.2469	0.1885	0.0008	0.2249
PDEFT9	PDEFT10	PDEFT11	PDEFT12	PDEFT9B	PDEFT10B	PDEFT11B	PDEFT12B
0.3033	0.3266	0.0072	0.1810	0.3557	0.3438	0.0087	0.2019

Module 1 pressures, psia

PSFP1	PSFP2	PSFP3	PSFP4	PSFP5	PSFP6	PSFP7	PSFP8
1.9927	7.5438	2.0560	2.0538	2.0631	2.2722	2.1086	1.9347
PSFP9	PSFP10	PSFP11	PSFP12	PSFP13	PSFP14	PSFP15	PSFP16
2.0342	2.0308	2.0263	2.1032	1.9998	2.0012	2.0920	2.0648
PSFP17	PSFP18	PSFP19	PSFP20	PSFP21	PSFP22	PSFP23	PTOJ
2.0759	2.3335	2.1594	3.3337	2.5497	3.3847	1.8842	7.0868
RKB105	RKB106	RKB107	RKB108	RKB109	RKB110	RKB111	RKB112
1.9223	1.8963	1.9136	1.8992	1.9432	1.9200	1.9064	1.9018

Trisonic Gasdynamics Facility
Air Force Wright Aeronautical Laboratory
WPAFB, Ohio
Project : MAIBL

Control Parameter

TPN	ΣTPN	Constant	Run no	Atm psia
619.	598.	3.	70.	14.35

Module 2a pressures, psia

RKB201	RKB202	RKB203	RKB204	RKB205	RKB206	RKB207	RKB208
7.5018	7.3721	7.4285	7.3615	7.3958	7.4400	7.2881	7.1293
RKB209	RKB210	RKB211	RKB212	RKB301	RKB302	RKB303	RKB304
7.1248	7.1790	7.1315	7.3532	7.2155	7.2316	7.2699	7.1745
RKB305	RKB306	RKB307	RKB308	RKB309	RKB310	RKB311	RKB312
3.4696	3.5219	3.4077	3.3983	3.3528	3.4125	3.3383	3.3920
RKB101	RKB102	RKB103	RKB104				
3.4887	3.4132	3.4912	3.3941				

Module 2b pressures, psia

PTTH31	PTTH32	PTTH33	PTTH34	PTTH35	PTTH36	PSTH1	PSTH2
7.5018	7.3721	7.4285	7.3615	7.3958	7.4400	7.2881	7.1293
PSTH3	PSTH4	PSTH5	PSTH6	PSTH7	PSTH8	PSTH9	PSTH10
7.1248	7.1790	7.1315	7.3532	7.2155	7.2316	7.2699	7.1745

Module 3 pressures, psia

PSD1	PSD2	PSD3	PTD1	PTD2	PTD3	PSJ1	PSJ2
3.4003	3.3697	3.4952	3.4357	3.3910	3.5113	1.8281	1.8131
PSJ3	PSJ4	PSJ5	PSJ6	PSDU1	PSDU2	PSDU3	PSDU4
1.7261	1.8503	2.0853	1.8472	7.3262	7.6264	9.2688	7.9611
PSDU5	PSDU6	PSDL1	PSDL2	PSDL3	PSDL4	PSDL5	PSDL6
8.0903	8.2329	7.2073	7.6087	7.8473	7.9860	8.0786	8.2074

Module 4 pressures, psia

PTTH1	PTTH2	PTTH3	PTTH4	PTTH5	PTTH6	PTTH7	PTTH8
4.9333	4.6630	4.4810	4.6613	4.4212	6.0794	5.9561	5.8310
PTTH9	PTTH10	ESP 4-31	PTTH12	PTTH13	PTTH14	PTTH15	PTTH16
7.1621	6.1263	6.0278	4.3309	2.0033	1.3080	1.5830	2.1001
PTTH17	PTTH18	PTTH19	PTTH20	PTTH21	PTTH22	PTTH23	PTTH24
7.4003	7.3652	1.4440	3.2523	2.8805	4.6506	3.2229	2.7873
PTTH25	PTTH26	PTTH27	PTTH28	PTTH29	PTTH30		
4.2759	5.7963	5.9860	4.3405	5.9412	5.9162		

Module 5 pressures, psia, Rake at 0 deg.

PTEFT1	PTEFT2	PTEFT3	PTEFT4	PTEFT5	PTEFT6	PTEFT7	PTEFT8
10.2583	9.9010	9.5585	9.2193	8.9831	10.1544	10.0438	9.8323
PTEFT9	PTEFT10	PTEFT11	PTEFT12	PTEFT13	PTEFT14	PTEFT15	PTEFT16
9.4895	9.1668	9.3938	9.0437	8.8709	8.7267	8.6021	10.0594
PTEFT17	PTEFT18	PTEFT19	PTEFT20	PEFT1	PEFT2	PEFT3	PEFT4
9.8725	9.6454	9.3763	9.1847	7.9299	7.8794	7.7953	7.7321
PEFT5	PEFT6	PEFT7	PEFT8	PEFT9	PEFT10	PEFT11	PEFT12
7.6728	7.9452	7.8798	7.7719	7.7607	7.6861	7.9426	7.8645

Trisonic Gasdynamics Facility
Air Force Wright Aeronautical Laboratory
WPAFB, Ohio
Project : MAIBL

Control Parameter

TPN	ZTPN	Constant	Run no	Atm psia
619.	598.	3.	70.	14.35

Module 6 pressures, psia, Rake at 0 deg.

PEFT13	PEFT14	PEFT15	PEFT16	PEFT17	PEFT18	PEFT19	PEFT20
7.8029	7.7323	7.6254	7.8947	7.8783	7.8085	7.7313	7.6127

PSP1	PSP2	PSP3	PSP4	PSP5	PSP6	PSP7	PSP8
2.8421	3.1045	4.3436	3.1349	3.1438	3.4313	2.8751	2.8507

PTP1	PTP2	PTP3	PTP4	PTP5	PTP6	PTP7	PTP8
14.2484	9.2831	8.8983	8.7359	8.9152	8.9971	9.1317	8.9494

PTP9	PTP10	PTP11	PTP12	PTP13	PTP14		PTP16
9.0079	9.0926	9.0279	8.5624	8.7368	9.1144		8.8600

Module 7 pressures, psia

PTP17	PTP18	PTP19	PTP20	PTP21	PTP22		PTP24
9.0831	14.2597	9.1592	8.6070	8.8407	9.2207		14.2510

PTP25	PTP26	PTP27	PTP28	PTP29	PTP30	PTP31	PTP32
9.2839	9.4001	9.2066	8.6444	8.9289	9.2822	9.4497	14.2596

PTP33	PTP34	PTP35	PTP36	PTP37	PTP38	PTP39	PTP40
9.4365	9.4642	9.2081	8.7573	8.9858	9.3743	9.5410	9.3690

PTP41	PTP42	PTP43	PTP44	PTP45	PTP46	PTP47	PTP48
9.5967	9.5560	9.2083	8.9524	9.0796	9.5395	9.6286	9.6191

Module 5 pressures, psia, Rake at 45 deg.

PTEFT1B	PTEFT2B	PTEFT3B	PTEFT4B	PTEFT5B	PTEFT6B	PTEFT7B	PTEFT8B
10.2215	9.8395	9.5261	9.3166	9.1419	9.7390	9.5100	9.3836

PTEFT9B	PTEFT10B	PTEFT11B	PTEFT12B	PTEFT13B	PTEFT14B	PTEFT15B	PTEFT16B
9.2007	8.9618	9.3848	9.2452	9.1097	9.0093	8.8420	10.1977

PTEFT17B	PTEFT18B	PTEFT19B	PTEFT20B	PEFT1B	PEFT2B	PEFT3B	PEFT4B
9.8164	9.5251	9.2745	9.0878	7.9113	7.8708	7.7843	7.7128

PEFT5B	PEFT6B	PEFT7B	PEFT8B	PEFT9B	PEFT10B	PEFT11B	PEFT12B
7.6464	7.9152	7.8630	7.8016	7.7673	7.7095	7.9413	7.8628

Module 6 pressures, psia, Rake at 45 deg.

PEFT13B	PEFT14B	PEFT15B	PEFT16B	PEFT17B	PEFT18B	PEFT19B	PEFT20B
7.7880	7.7042	7.5755	7.8934	7.8698	7.8055	7.7354	7.6403

Subsonic Aerodynamic Research Laboratory
Air Force Wright Laboratory
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Project : FAA
Taken on 3/ 8/93 at 14:53:16 and Printed on 3/ 9/93 at 08:29:38
BURST DISK #8

TPN	ZTPN	Constant	Run_no	Dew_Pt Deg_R	PLUS12 volts	PLUS15 volts	MINUS15 volts
1681.	1597.	4.	0.	491.0	12.234	14.811	-14.902

Calculated Test Conditions

MACH	Q psf	VTS Ft/Sec	RN Ft	North_WD Wind_Dir	South_WD Wind_Dir	North_WS Wind_Spd	South_WS Wind_Spd
0.306	125.18	331.78	0.2111E+07	SE	SE	00	00

Alpha deg	Beta deg	Yaw deg	Meas_Ps psfa			ESP_ref psfa	Time sec
0.00	-0.01	0.01	1909.51			1306.68	0.000

POIN psfa	POC psfa	POTS psfa	PSTS psfa	TOIN deg R	MRPM rpm	PREF psfa	ATM psfa
2040.72	1986.16	2040.28	1912.14	499.02	252.61	2150.93	2041.06

Tunnel Pressures - psf

DPSST	DPSSW	DPSSB	DPSSE	DPSC1	DPSC2	DPSC3	
0.8362	0.8231	1.0778	0.8557	0.8480	0.8206	0.8402	
PSCT	**PSCW**	**PSCB**	**PSCE**	**PSTC**	**PSBW**	**PSBC**	**PSBE**
2004.92	2004.70	2004.30	2007.33	1915.89	1918.87	1915.01	1911.41
PSTC1	**PSBW1**	**PSBC1**	**PSBE1**	**PSTC2**	**PSBW2**		**PSBE2**
1917.58	1919.60	1916.31	1915.07	1905.60	1917.23		1912.44
PSMST1	**PSMSW1**		**PSMSE1**		**PSMSW3**		**PSMSE3**
1897.43	1897.28		1905.87		1908.18		1905.82
PSD1T	**PSD1W**	**PSD1B**	**PSD1E**				
1967.81	1972.49	1977.98	1971.37				
DPSFET	**DPSFEW**	**DPSFEB**	**DPSFEE**	**PSET**	**PSEW**	**PSEB**	**PSEE**
18.226	21.118	23.082	17.882	2042.23	2043.09	2040.42	2040.29

PONAC
2026.65

Subsonic Aerodynamic Research Laboratory
Air Force Wright Laboratory
WPAFB, Ohio
Project : F^A
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TPN	ZTPN	Constant	Run_no	Config	Dew_Pt Deg R	POTS psfa	CID
1681.	1597.	4.	0.	4610	491.0	2040.28	0.

Test Conditions

MACH	Q psf	PSTS psfa	Meas_Ps psfa	TSTS deg R	TOIN deg R	Alpha deg	Beta deg
0.306	125.18	1912.14	1909.51	489.86	499.02	0.00	0.00

Model Station 5.00 statics (psfa)

FS101	FS102	FS103	FS104	FS105	FS107	FS109	FS111
1949.114	1938.532	1927.878	1928.094	1923.587	1922.423	1926.152	1925.071
FS113	FS114	FS115	FS116	FS117	FS118	FS119	FS120
1924.111	1922.999	1927.531	1926.308	1923.147	1925.183	1928.919	1935.751

Model Station 11.00 statics (psfa)

FS201	FS202	FS203	FS204	FS205	FS207	FS209	FS211
1882.549	1910.493	1902.475	1909.626	1911.049	1911.790	1911.277	1908.258
FS213	FS214	FS215	FS216	FS217	FS218	FS219	FS220
1909.518	1909.055	1909.271	1915.005	1912.674	1907.930	1904.180	1905.803

Model Station 17.00 statics (psfa)

FS301	FS302	FS303	FS304	FS305	FS307	FS309	FS311
1899.823	1892.043	1897.531	1901.357	1998.947	1904.149	1906.157	1905.869
FS313	FS314	FS315	FS316	FS317	FS318	FS319	FS320
1905.215	1901.506	1903.166	1900.236	1902.905	1903.579	1895.169	1901.242

Model Station 23.00 statics (psfa)

FS401	FS402	FS403	FS404	FS405	FS406	FS408	FS409
1905.070	1905.975	1904.142	1904.102	1906.420	1905.241	1908.777	1908.224
FS410	FS412	FS413	FS414	FS415	FS416	FS417	FS418
1910.678	1908.353	1927.779	1908.747	1910.209	1907.405	1904.515	1903.483
FS419	FS420						
1904.488	1904.684						

Model Station 27.00 statics (psfa)

FS501	FS502	FS503	FS504	FS505	FS506	FS508	FS509
1910.619	1910.458	1907.436	1908.567	1904.439	1904.422	1913.564	1955.909
FS510	FS512	FS513	FS514	FS515	FS516	FS517	FS518
1921.240	1911.301	1910.968	1904.217	1911.797	1910.228	1906.106	1908.125
FS519	FS520						
1910.336	1912.297						

Model Station 33.00 statics (psfa)

FS601	FS602	FS603	FS604	FS605	FS606	FS608	FS609
1917.243	1913.995	1915.813	1914.353	1904.846	1914.074	1849.629	1809.094
FS610	FS612	FS613	FS614	FS615	FS616	FS617	FS618
1791.260	1878.013	1905.899	1915.963	1916.505	1916.338	1915.176	1915.977
FS619	FS620						
1914.669	1917.280						

Subsonic Aerodynamic Research Laboratory
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TPN	ZTPN	Constant	Run_no	Config	Dew_Pt Deg R	POTS psfa	CID
1681.	1597.	4.	0.	4610	491.0	2040.28	0.

Test Conditions

MACH	Q psf	PSTS psfa	Meas_Ps psfa	TSTS deg R	TOIN deg R	Alpha deg	Beta deg
0.306	125.18	1912.14	1909.51	489.86	499.02	0.00	0.00

Model Station 39.00 statics (psfa)

FS701	FS702	FS703	FS704	FS705	FS706	FS708	FS709
1919.639	1920.394	1917.757	1917.056	1916.595	1916.211	1916.654	1918.193

FS710	FS712	FS713	FS714	FS715	FS716	FS717	FS718
1917.095	1916.991	1917.405	1915.987	1914.739	1917.703	1915.420	1918.711

FS719	FS720
1917.910	1906.210

Model Station 47.00 statics (psfa)

FS801	FS802	FS803	FS804	FS805	FS807	FS809	FS811
1921.179	1916.266	1917.142	1916.104	191[illegible].398	1913.175	1914.672	1917.343

FS813	FS814	FS815	FS816	FS817	FS818	FS819	FS820
1915.993	1916.847	1917.070	1917.871	1914.646	1918.822	1918.661	1920.049

Model Station 67.00 statics (psfa)

FS901	FS902	FS903	FS904	FS905	FS907	FS909	FS911
1918.026	1918.677	1918.495	1915.827	1916.959	1917.208	1918.585	1916.051

FS913	FS914	FS915	FS916	FS917	FS918	FS919	FS920
1917.726	1917.636	1918.011	1918.172	1918.784	1919.719	1919.458	1919.920

Model Station 84.00 statics (psfa)

FS1001	FS1002	FS1003	FS1004	FS1005	FS1007	FS1009	FS1011
1916.950	1917.563	1918.074	1917.132	1920.789	1917.893	1916.119	1917.146

FS1013	FS1014	FS1015	FS1016	FS1017	FS1018	FS1019	FS1020
1916.868	1917.576	1918.730	1917.919	1918.154	1915.650	1916.679	1917.924

Subsonic Aerodynamic Research Laboratory
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TPN	ZTPN	Constant	Run_no	Config	Dew_Pt Deg R	POTS psfa	CID
1681.	1597.	4.	0.	4610	491.0	2040.28	0.

Test Conditions

MACH	Q psf	PSTS psfa	Meas_Ps psfa	TSTS deg R	TOIN deg R	Alpha deg	Beta deg
0.306	125.18	1912.14	1909.51	489.86	499.02	0.00	0.00

High Density statics (psfa)

H116	H118	H120	H216	H218	H220	H316	H318
1901.270	1901.620	1903.652	1909.761	1908.787	1908.589	1922.542	1907.052
H320	H416	H420	H516	H518	H520	H601	H635
1922.815	1923.396	1909.460	1909.095	1909.043	1911.051	1904.185	1911.064
H709	H715	H716	H718	H720	H721	H727	H802
1920.073	1907.914	1918.273	1963.225	1926.585	1921.424	1939.603	1907.820
H816	H818	H820	H834	H916	H918	H920	H1003
1909.504	1910.161	1932.271	1907.504	1937.627	1906.576	1910.811	1906.681
H1033	H1116	H1118	H1120	H1205	H1216	H1218	H1220
1926.257	1964.396	1910.848	1911.092	1908.266	1950.032	1942.046	1943.062
H1231	H1316	H1320	H1406	H1416	H1418	H1420	H1430
1938.330	1997.335	1953.152	1964.698	1945.381	1994.915	1959.722	1871.898
H1508	H1528	H1616	H1618	H1620	H1709	H1716	H1718
1905.632	1891.628	1966.455	1972.776	1965.504	1897.193	1987.704	1939.545
H1720	H1727	H1810	H1816	H1818	H1820	H1826	H1911
1965.792	1875.644	1886.397	1965.542	2018.555	1951.524	1862.435	1889.819
H1916	H1920	H1925	H2012	H2016	H2018	H2020	H2024
1998.239	1966.299	1844.414	1946.125	1981.139	2021.277	1972.046	1798.895
H2116	H2118	H2120	H2213	H2216	H2218	H2220	H2223
1952.576	2006.314	1980.636	1884.932	1971.519	1987.700	1982.202	1745.165
H2316	H2318	H2320	H2401	H2402	H2403	H2405	H2407
2005.768	2037.741	1978.065	1913.911	1910.748	1908.902	1898.447	1930.613
H2409	H2411	H2412	H2413	H2413	H2422	H2423	H2424
1804.245	1905.311	1876.905	1873.942	1907.404	1404.170	1603.975	1663.652
H2425	H2427	H2429	H2431	H2433	H2434	H2435	H2601
1686.944	1773.083	1805.056	1860.410	1912.906	1881.474	1916.682	1911.053
H2601	H2603	H2605	H2607	H2609	H2611	H2612	H2613
1910.728	1880.936	1856.461	1832.917	1784.521	1716.499	1706.334	1703.749
H2614	H2622	H2623	H2624	H2625	H2627	H2629	H2631
1845.130	1740.091	1737.363	1744.385	1762.128	1800.697	1822.767	1850.669
H2633	H2634	H2635	H2701	H2702	H2703	H2705	H2707
1914.176	1915.172	1888.458	1914.304	1878.284	1891.978	1840.944	1824.139
H2709	H2711	H2712	H2713	H2714	H2722	H2723	H2724
1802.473	1759.780	1767.468	1780.703	1741.787	1763.235	1785.009	1770.460
H2725	H2727	H2729	H2731	H2733	H2734	H2735	H2801
1763.169	1802.984	1862.683	1841.750	1913.153	1912.912	1928.148	1912.995
H2802	H2803	H2805	H2807	H2809	H2811	H2812	H2813
1895.093	1909.988	1852.789	1843.832	1847.073	1850.506	1847.343	1789.571
H2814	H2822	H2823	H2824	H2825	H2827	H2829	H2831
1845.135	1766.643	1774.578	1784.910	1782.660	1786.236	1797.331	1864.715
H2833	H2834	H2835	H2916	H2918	H2920	H3016	H3018
1914.953	1918.876	1914.076	1718.721	1789.117	1801.429	1702.705	1745.853
H3020	H3116	H3118	H3120	H3216	H3218	H3220	H3316
1770.637	1674.318	1714.176	1765.205	1801.834	1757.063	1735.066	1706.172
H3318	H3320	H3416	H3418	H3420	H3516	H3520	H3616
1728.376	1755.649	1730.155	1749.484	1759.713	1824.004	1790.490	1914.724
H3618	H3620	H3716	H3718	H3720	H3816	H3818	H3820
1917.170	1914.903	1914.242	1916.759	1915.747	1916.169	1916.951	1914.544

Subsonic Aerodynamic Research Laboratory
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TPN	ZTPN	Constant	Run_no	Config	Dew_Pt Deg R	POTS psfa	CID
1681.	1597.	4.	0.	4610	491.0	2040.28	0.

Test Conditions

MACH	Q psf	PSTS psfa	Meas_Ps psfa	TSTS deg R	TOIN deg R	Alpha deg	Beta deg
0.306	125.18	1912.14	1909.51	489.86	499.02	0.00	0.00

Forward BL Rake Totals (psfa)

FB101	FB102	FB103	FB104	FB105	FB106	FB107	FB108
2074.119	2133.784	2116.612	2191.612	2113.950	2119.394	2058.891	2156.532
FB109	FB110	FB201	FB202	FB203	FB204	FB205	FB206
2082.552	2101.583	2135.526	2128.526	2108.689	2140.295	2107.328	2114.440
FB207	FB208	FB209	FB210	FB301	FB302	FB303	FB304
2070.560	2155.003	2152.225	2124.833	2126.213	2104.048	2119.102	2106.785
FB305	FB306	FB307	FB308	FB309	FB310	FB401	FB402
2139.201	2131.204	2146.374	2119.667	2154.559	2128.707	2099.046	2120.371
FB403	FB404	FB405	FB406	FB407	FB408	FB409	FB410
2123.653	2144.030	2151.320	2145.330	2130.160	2100.290	2104.417	2122.655
FB501	FB502	FB503	FB504	FB505	FB506	FB507	FB508
2110.920	2126.874	2102.572	2136.470	2103.846	2103.953	2142.066	2135.712
FB509	FB510						
2113.430	2144.192						

AFT BL Rake Totals & Statics (psfa)

B1	B2	BT101	BT102	BT103	BT104	BT105	BT106
1958.056	1959.775	2135.526	2128.526	2104.048	2114.440	2108.689	2070.560
BT107	BT108	BT109	BT110	BT201	BT202	BT203	BT204
2119.667	2107.328	2152.225	2155.003	1962.705	1963.262	1961.246	1962.481
BT205	BT206	BT207	BT208	BT209	BT210		
1958.602	1957.347	1966.796	1965.300	1966.544	1966.506		

Plume Rake Totals & Statics (psfa)

UT1	UT2	UT3	UT4	UT5	UT6	UT7	UT8
1920.552	1903.092	1904.589	1911.549	1922.999	1915.426	1927.222	1909.172
UT9	UT10	UT11	UT12	UT13	UT14	UT15	UT16
1905.464	1901.826	1904.130	1916.073	1912.311	1924.668	1906.439	1909.231
UT17	UT18	UT19	UT20	UT21	UT22	UT23	UT24
1916.884	1904.643	1903.689	1906.712	1906.827	1910.453	1898.816	1910.867
UT25	UT26	UT27	UT28	UT29	UT30	U1	U2
1913.696	1901.864	1914.179	1923.558	1915.649	1904.851	1901.288	1925.000

Jet Exit Rake (psfa)

JT101	JT102	JT103	JT104	JT105	JT106	JT107	JT108
2038.002	2041.105	2038.560	2074.779	2036.868	2040.268	2042.876	2042.183
JT109	JT110	JT111	JT112	JT113	JT114	JT115	JT116
2039.049	2065.801	2011.083	2005.041	2039.025	2025.834	2006.297	1987.593
JT201	JT202	JT203	JT204	JT205	JT206	JT207	JT208
2012.426	2012.809	2011.166	2014.412	2023.266	2015.675	2025.374	2055.777
JT209	JT210	JT211	JT212	JT213	JT214	JT215	JT216
2015.562	2050.190	2040.377	2023.656	2045.750	2002.447	2048.093	2035.062
JT301	JT302	JT303	JT304	JT305	JT306	JT307	JT308
2076.359	2051.680	1979.804	1987.050	2046.033	1949.695	2028.106	1991.317
JT309	JT310	JT311	JT312	JT313	JT314	JT315	JT316
2020.110	1989.101	2044.317	2061.507	2027.298	1928.287	2079.960	2012.344

Subsonic Aerodynamic Research Laboratory
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TPN	ZTPN	Constant	Run_no	Config	Dew_Pt Deg R	POTS psfa	CID
1681.	1597.	4.	0.	4610	491.0	2040.28	0.

Test Conditions

MACH	Q psf	PSTS psfa	Meas_Ps psfa	TSTS deg R	TOIN deg R	Alpha deg	Beta deg
0.306	125.18	1912.14	1909.51	489.86	499.02	0.00	0.00

Jet Exit Statics (psfa)

N1	N2	N3	N4
1905.132	1902.687	1907.857	1906.923

Thin Wall Cavity Statics (psfa)

IC1	IC2	IC3	IC4	IC5	IC6
1913.696	1901.864	1914.179	1923.558	1915.649	1904.851

Variable Depth Cavity (psfa)

V1	V2	V3	V4	V5	V6	V7	V8
1920.552	1903.092	1904.589	1911.549	1922.999	1915.426	1927.222	1909.172
V9	V10	V11	V12	V13	V14	V15	V16
1905.464	1901.826	1904.130	1916.073	1912.311	1924.668	1906.439	1909.231
V17	V18	V19	V20	V21	V22	V23	V24
1916.884	1904.643	1903.689	1906.712	1906.827	1910.453	1898.816	1910.867
V25	V26	V27	V28	V29	V30	V32	V33
1913.696	1901.864	1914.179	1923.558	1915.649	1904.851	1901.288	1925.000

Plenum Statics & Totals (psfa)

P1	P2	PT1	PT2	PT3	PT4	PT5
9724.07	10459.59	9548.55	9604.87	9806.64	9574.08	9584.34

Air Line (psfa)

A1	A2
10056.21	10144.63

T/C (deg. R.)

HTC709	HTC715	HTC718	HTC721	HTC727	HTC2017	HTC3117	HTC3717
510.925	510.972	501.533	516.692	516.872	510.925	510.972	501.533

VTC1	VTC2	VTC3	VTC4	PTC1	PTC2	ATC1
516.692	516.872	514.776	430.394	516.692	516.872	514.776

Blowing Coefficients

Cmu
0.0003

SARL Secondary Air System

T3 degR	T4 degR	T5 degR	T6 degR	PT1 psi	PT2 psia	PT3 psia	PT4 psia
0.00	528.77	0.00	528.43	265.43	54.28	66.54	48.82

PT5 psia	DP1 psid	DP2 psid	DP3 psid	DP4 psid
67.07	0.14	0.00	-0.06	0.21

LVS_flow Lbm/sec	HVS_flow Lbm/sec	LVN_flow Lbm/sec	HVN_flow Lbm/sec	Mdot Lbm/sec	CntrlAir psi	HR_TOIN degR
0.00	0.01	0.00	0.32	0.32	-2.92	498.41

SARL, WL/FIM

Maverick Ring Wing Test

Taken on 7/16/92 at 09:12:44 and Printed on 7/16/92 at 13:51:13

-NORMAL FORCE

TPN	NF lbs	PM in-lb	SF lbs	YM in-lb	RM in-lb	AXIAL lbs	Comment Char 1
65.	-98.9	-2.3	-1.97	-2.37	-0.28	0.26	-NORMAL FORCE
66.	-198.2	-3.1	-3.38	-4.94	-0.32	0.35	-NORMAL FORCE
67.	-398.4	-3.6	-4.60	-8.15	-0.55	0.56	-NORMAL FORCE
68.	-598.1	-3.2	-4.77	-10.30	-0.50	0.64	-NORMAL FORCE
69.	-799.1	-1.1	-4.53	-10.57	-0.80	0.65	-NORMAL FORCE
70.	-597.6	-2.8	-3.77	-8.46	-1.17	0.80	-NORMAL FORCE
71.	-397.4	-3.2	-3.54	-6.34	-0.78	0.77	-NORMAL FORCE
72.	-197.0	-2.7	-3.09	-4.30	-0.38	0.35	-NORMAL FORCE
73.	-98.0	-1.5	-1.86	-2.63	-0.75	0.22	-NORMAL FORCE
74.	0.9	-0.1	0.08	-0.52	-0.09	0.03	-NORMAL FORCE
76.	98.1	1.5	1.80	-3.04	0.40	-0.07	+NORMAL FORCE
77.	197.2	2.6	2.76	-4.32	0.58	0.00	+NORMAL FORCE
78.	395.9	3.8	3.51	-4.85	0.22	0.10	+NORMAL FORCE
79.	595.3	4.4	3.95	-4.87	0.56	0.34	+NORMAL FORCE
80.	795.3	5.3	4.24	-4.49	0.94	0.54	+NORMAL FORCE
81.	595.5	3.1	3.45	-5.45	0.37	0.27	+NORMAL FORCE
82.	395.7	1.3	2.87	-6.72	0.76	0.12	+NORMAL FORCE
83.	197.0	0.1	1.67	-7.37	0.46	0.20	+NORMAL FORCE
85.	0.4	-0.1	97.02	3.45	-0.12	0.12	+SIDE FORCE
86.	0.3	0.0	196.24	3.78	-0.02	0.20	+SIDE FORCE
87.	0.3	-0.4	296.18	3.73	-0.10	0.19	+SIDE FORCE
88.	0.6	-0.4	396.83	3.71	0.20	0.15	+SIDE FORCE
89.	0.8	-0.6	497.14	3.05	0.49	0.08	+SIDE FORCE
90.	0.7	-0.7	396.76	3.64	0.32	0.10	+SIDE FORCE
91.	1.0	-0.2	296.57	4.29	0.07	0.17	+SIDE FORCE
92.	0.7	0.1	196.39	4.67	-0.08	0.13	+SIDE FORCE
93.	1.0	-1.2	97.07	4.24	-0.21	0.11	+SIDE FORCE
94.	0.5	0.4	0.20	0.35	-0.09	0.00	+SIDE FORCE
96.	-0.4	0.8	-99.97	0.15	-0.26	-0.04	-SIDE FORCE
97.	0.0	-0.3	-199.96	0.40	-0.54	-0.04	-SIDE FORCE
98.	-0.7	0.7	-300.47	0.19	-0.68	-0.07	-SIDE FORCE
99.	-1.0	1.8	-400.34	0.20	-0.37	-0.22	-SIDE FORCE
100.	-0.9	2.9	-500.50	0.23	-0.43	-0.20	-SIDE FORCE
101.	-1.0	2.8	-400.71	0.67	-0.47	-0.38	-SIDE FORCE
102.	-0.8	2.2	-299.37	0.07	-0.27	-0.20	-SIDE FORCE
103.	-1.0	1.7	-199.44	0.00	-0.06	-0.05	-SIDE FORCE
104.	-0.7	2.0	-99.05	0.51	0.30	-0.10	-SIDE FORCE
105.	-0.6	0.7	0.80	0.34	0.05	-0.08	-SIDE FORCE
107.	0.3	-0.4	0.05	0.72	100.32	-0.21	+ ROLL
108.	0.4	-0.8	0.41	1.08	300.74	-0.42	+ ROLL
109.	-0.5	-1.3	0.28	1.22	702.08	-0.56	+ ROLL
110.	0.5	-1.9	0.14	-0.45	1103.64	-0.36	+ ROLL
111.	1.8	-2.6	0.06	-1.32	1504.63	0.18	+ ROLL
112.	0.4	0.2	-0.30	-2.76	1103.85	-0.51	+ ROLL
113.	-1.1	0.3	0.21	-0.68	702.65	-0.47	+ ROLL
114.	-0.8	0.6	0.91	-1.06	301.17	-0.25	+ ROLL
115.	0.1	0.6	0.34	-0.66	100.53	-0.13	+ ROLL
116.	0.5	0.3	-0.10	-0.39	0.17	0.01	+ ROLL
118.	0.1	1.4	-0.14	-1.28	-100.56	0.06	- ROLL
119.	-0.1	2.1	-0.22	-1.14	-301.16	0.24	- ROLL
120.	-0.3	3.5	0.20	-0.01	-702.48	0.24	- ROLL
121.	-0.6	2.1	0.10	-0.35	-1103.43	0.07	- ROLL
122.	-1.3	0.8	0.39	-0.61	-1504.95	0.07	- ROLL
123.	-0.4	0.4	-0.87	-1.26	-1103.64	-0.27	- ROLL
124.	-0.7	1.6	-0.30	-0.98	-702.77	-0.30	- ROLL
125.	-0.7	1.7	0.30	-0.66	-301.27	-0.01	- ROLL
126.	0.2	-0.1	0.53	-1.17	-100.84	-0.05	- ROLL
127.	0.6	-0.3	0.22	0.51	-0.22	-0.05	- ROLL

SARL, WL/FIM

Maverick Ring Wing Test

Taken on 7/16/92 at 09:12:44 and Printed on 7/16/92 at 13:51:13

-NORMAL FORCE

TPN	nor def deg.	side def deg.	roll def deg.	Pitch_S deg	Roll_S deg
65.	-0.13	0.00	0.05	0.08	-0.3
66.	-0.27	-0.01	0.10	0.21	-0.3
67.	-0.54	-0.01	0.21	0.48	-0.4
68.	-0.81	-0.02	0.32	0.77	-0.4
69.	-1.08	-0.02	0.42	1.07	-0.5
70.	-0.81	-0.01	0.32	0.82	-0.4
71.	-0.54	-0.01	0.21	0.57	-0.4
72.	-0.27	-0.01	0.10	0.29	-0.4
73.	-0.13	0.00	0.05	0.14	-0.3
74.	0.00	0.00	0.00	0.00	-0.3
76.	0.15	0.00	-0.05	0.16	179.7
77.	0.29	0.01	-0.10	0.32	179.7
78.	0.59	0.01	-0.21	0.60	179.8
79.	0.89	0.01	-0.31	0.92	179.8
80.	1.19	0.02	-0.42	1.21	179.9
81.	0.89	0.01	-0.31	0.96	179.9
82.	0.59	0.01	-0.21	0.68	179.8
83.	0.29	0.00	-0.10	0.40	179.8
85.	0.00	0.14	0.00	0.18	89.6
86.	0.01	0.29	0.00	0.34	89.7
87.	0.01	0.44	0.00	0.49	89.7
88.	0.01	0.59	0.00	0.65	89.7
89.	0.02	0.74	0.00	0.80	89.7
90.	0.01	0.59	0.00	0.66	89.7
91.	0.01	0.44	0.00	0.53	89.7
92.	0.01	0.29	0.00	0.36	89.7
93.	0.00	0.14	0.00	0.21	89.7
94.	0.00	0.00	0.00	0.04	89.7
96.	0.00	-0.17	0.00	0.16	-90.2
97.	-0.01	-0.33	0.00	0.34	-90.2
98.	-0.01	-0.50	0.00	0.52	-90.2
99.	-0.01	-0.67	0.00	0.69	-90.2
100.	-0.02	-0.84	0.00	0.88	-90.3
101.	-0.01	-0.67	0.00	0.73	-90.3
102.	-0.01	-0.50	0.00	0.60	-90.2
103.	-0.01	-0.33	0.00	0.45	-90.3
104.	0.00	-0.17	0.00	0.28	-90.2
105.	0.00	0.00	0.00	0.10	-90.2
107.	0.00	0.00	0.11	0.12	-0.6
108.	-0.01	0.00	0.33	0.12	-0.8
109.	-0.02	0.00	0.76	0.12	-1.3
110.	-0.03	0.01	1.20	0.12	-1.7
111.	-0.04	0.01	1.63	0.12	-2.1
112.	-0.03	0.00	1.20	0.12	-1.8
113.	-0.02	0.00	0.76	0.12	-1.4
114.	-0.01	0.00	0.33	0.12	-0.9
115.	0.00	0.00	0.11	0.12	-0.7
116.	0.00	0.00	0.00	0.12	-0.5
118.	0.00	0.00	-0.11	0.14	0.0
119.	0.01	0.00	-0.33	0.14	0.1
120.	0.02	0.00	-0.76	0.14	0.6
121.	0.04	-0.01	-1.19	0.14	1.0
122.	0.05	-0.01	-1.62	0.14	1.4
123.	0.04	-0.01	-1.19	0.14	1.1
124.	0.02	0.00	-0.76	0.14	0.7
125.	0.01	0.00	-0.32	0.14	0.2
126.	0.00	0.00	-0.11	0.14	0.0
127.	0.00	0.00	0.00	0.14	-0.1

SARL, WL/FIM

Maverick Ring Wing Test

Taken on 7/16/92 at 09:12:44 and Printed on 7/16/92 at 13:51:13

-NORMAL FORCE

TPN	ZTPN	N1 volts	N2 volts	Y1 volts	Y2 volts	Roll volts	Axial volts
65.	64.	-0.000546	-0.000471	-0.000113	-0.000205	0.000136	0.000736
66.	64.	-0.000785	-0.000695	-0.000145	-0.000212	0.000136	0.000741
67.	64	-0.001265	-0.001146	-0.000188	-0.000220	0.000134	0.000755
68.	64.	-0.001744	-0.001597	-0.000218	-0.000222	0.000134	0.000761
69.	64.	-0.002224	-0.002052	-0.000237	-0.000227	0.000132	0.000763
70.	64.	-0.001742	-0.001596	-0.000202	-0.000220	0.000130	0.000771
71.	64.	-0.001262	-0.001144	-0.000172	-0.000217	0.000133	0.000768
72.	64.	-0.000781	-0.000692	-0.000140	-0.000212	0.000135	0.000741
73.	64.	-0.000543	-0.000470	-0.000113	-0.000203	0.000133	0.000733
74.	64.	-0.000305	-0.000247	-0.000077	-0.000188	0.000137	0.000722
76.	75.	0.000054	0.000077	-0.000046	-0.000146	0.000142	0.000707
77.	75.	0.000297	0.000304	-0.000029	-0.000129	0.000144	0.000705
78.	75.	0.000783	0.000762	0.000000	-0.000113	0.000143	0.000698
79.	75.	0.001271	0.001221	0.000029	-0.000102	0.000147	0.000700
80.	75.	0.001760	0.001682	0.000058	-0.000094	0.000151	0.000699
81.	75.	0.001270	0.001223	0.000022	-0.000105	0.000146	0.000696
82.	75.	0.000781	0.000763	-0.000013	-0.000112	0.000147	0.000700
83.	75.	0.000295	0.000306	-0.000051	-0.000127	0.000143	0.000717
85.	84.	-0.000248	-0.000193	0.001094	0.000994	0.000138	0.000766
86.	84.	-0.000251	-0.000180	0.002047	0.001983	0.000139	0.000790
87.	84.	-0.000254	-0.000166	0.003006	0.002981	0.000138	0.000810
88.	84.	-0.000256	-0.000153	0.003972	0.003985	0.000140	0.000828
89.	84.	-0.000259	-0.000139	0.004933	0.004989	0.000141	0.000845
90.	84.	-0.000256	-0.000152	0.003972	0.003985	0.000140	0.000825
91.	84.	-0.000252	-0.000165	0.003012	0.002982	0.000139	0.000810
92.	84.	-0.000250	-0.000179	0.002052	0.001981	0.000138	0.000786
93.	84.	-0.000247	-0.000190	0.001097	0.000992	0.000138	0.000765
94.	84.	-0.000245	-0.000206	0.000152	0.000041	0.000138	0.000739
96.	95.	-0.000241	-0.000231	-0.001234	-0.001350	0.000139	0.000689
97.	95.	-0.000238	-0.000243	-0.002149	-0.002306	0.000138	0.000662
98.	95.	-0.000236	-0.000260	-0.003070	-0.003264	0.000138	0.000634
99.	95.	-0.000233	-0.000277	-0.003984	-0.004217	0.000141	0.000598
100.	95.	-0.000229	-0.000292	-0.004902	-0.005173	0.000141	0.000572
101.	95.	-0.000232	-0.000278	-0.003986	-0.004222	0.000140	0.000588
102.	95.	-0.000235	-0.000262	-0.003060	-0.003253	0.000141	0.000627
103.	95.	-0.000239	-0.000247	-0.002145	-0.002299	0.000141	0.000662
104.	95.	-0.000241	-0.000232	-0.001224	-0.001343	0.000143	0.000686
105.	95.	-0.000244	-0.000216	-0.000310	-0.000389	0.000141	0.000713
107.	106.	-0.000639	-0.000588	-0.000143	-0.000202	0.000739	0.000786
108.	106.	-0.000636	-0.000610	-0.000134	-0.000193	0.001937	0.000803
109.	106.	-0.000634	-0.000656	-0.000126	-0.000179	0.004337	0.000854
110.	106.	-0.000626	-0.000699	-0.000126	-0.000159	0.006738	0.000926
111.	106.	-0.000619	-0.000740	-0.000121	-0.000141	0.009135	0.001017
112.	106.	-0.000625	-0.000701	-0.000138	-0.000154	0.006739	0.000917
113.	106.	-0.000634	-0.000659	-0.000134	-0.000172	0.004340	0.000860
114.	106.	-0.000638	-0.000614	-0.000137	-0.000179	0.001940	0.000813
115.	106.	-0.000639	-0.000589	-0.000145	-0.000194	0.000740	0.000791
116.	106.	-0.000639	-0.000577	-0.000150	-0.000203	0.000140	0.000784
118.	117.	-0.000638	-0.000564	-0.000145	-0.000196	-0.000462	0.000753
119.	117.	-0.000639	-0.000542	-0.000147	-0.000206	-0.001661	0.000740
120.	117.	-0.000642	-0.000496	-0.000143	-0.000224	-0.004060	0.000694
121.	117.	-0.000647	-0.000449	-0.000149	-0.000241	-0.006457	0.000638
122.	117.	-0.000653	-0.000402	-0.000151	-0.000255	-0.008857	0.000591
123.	117.	-0.000648	-0.000447	-0.000161	-0.000247	-0.006458	0.000617
124.	117.	-0.000644	-0.000496	-0.000151	-0.000225	-0.004062	0.000662
125.	117.	-0.000641	-0.000543	-0.000141	-0.000203	-0.001662	0.000726
126.	117.	-0.000639	-0.000562	-0.000138	-0.000189	-0.000464	0.000746
127.	117.	-0.000637	-0.000573	-0.000134	-0.000195	0.000137	0.000758

SARL, WL/FIM
FAA Aircraft Hardening Test
Taken on 3/ 9/93 at 14:33:45 and Printed on 3/ 9/93 at 14:50:17
BURST DISK #10 @4 DEG ALPHA

TPN	Time sec	P1	P2	ATC1	PTC1	A1	A2
1982.	0.000	7770.77	7759.74	511.322	511.532	7753.45	7776.01
1983.	0.025	7813.29	7795.46	511.323	511.535	7791.86	7816.85
1984.	0.050	7887.85	7861.30	511.315	511.515	7856.59	7880.06
1985.	0.075	7898.36	7936.33	511.309	511.521	7937.64	7965.63
1986.	0.100	8029.67	7982.28	511.308	511.513	8017.66	8039.54
1987.	0.125	8080.63	8104.81	511.310	511.505	8064.00	8124.63
1988.	0.150	8115.84	8088.98	511.313	511.523	8080.85	8111.50
1989.	0.175	8165.24	8156.90	511.316	511.515	8148.26	8177.63
1990.	0.200	8248.29	8229.93	511.318	511.516	8230.96	8283.15
1991.	0.225	8325.05	8306.03	511.315	511.539	8321.06	8330.32
1992.	0.250	8338.19	8367.33	511.319	511.524	8361.11	8387.70
1993.	0.275	8422.34	8386.23	511.310	511.532	8396.42	8417.85
1994.	0.300	8466.52	8453.16	511.310	511.544	8437.53	8412.50
1995.	0.325	8523.33	8511.41	511.305	511.528	8462.83	8525.33
1996.	0.350	8592.26	8581.42	511.314	511.532	8612.03	8639.13
1997.	0.375	8681.20	8646.84	511.318	511.557	8646.84	8651.77
1998.	0.400	8705.41	8736.80	511.318	511.535	8708.02	8731.05
1999.	0.425	8692.25	8739.87	511.322	511.537	8740.72	8755.37
2000.	0.450	8802.79	8819.62	511.321	511.548	8792.94	8813.74
2001.	0.475	8879.14	8862.06	511.316	511.516	8862.58	8889.13
2002.	0.500	8955.50	8897.85	511.313	511.513	8923.27	8932.43
2003.	0.525	9019.24	8959.22	511.311	511.534	9007.18	9028.26
2004.	0.550	9061.91	9046.67	511.312	511.518	9035.68	9057.45
2005.	0.575	9150.95	9059.46	511.313	511.533	9082.66	9098.81
2006.	0.600	9144.63	9163.31	511.316	511.549	9133.34	9164.00
2007.	0.625	9218.93	9201.68	511.314	511.537	9146.01	9220.44
2008.	0.650	9297.46	9278.43	511.313	511.539	9263.76	9286.62
2009.	0.675	9288.50	9322.95	511.316	511.551	9337.17	9346.47
2010.	0.700	9388.13	9353.14	511.302	511.510	9367.80	9370.80
2011.	0.725	9423.45	9406.88	511.304	511.514	9393.68	9400.00
2012.	0.750	9473.01	9470.86	511.307	511.517	9476.09	9490.52
2013.	0.775	9559.49	9539.46	511.310	511.499	9571.18	9589.82
2014.	0.800	9591.66	9595.26	511.309	511.519	9609.75	9623.89
2015.	0.825	9702.95	9657.73	511.313	511.539	9658.90	9675.49
2016.	0.850	9716.13	9737.10	511.310	511.538	9708.57	9748.03
2017.	0.875	9711.39	9734.03	511.320	511.565	9742.39	9751.44
2018.	0.900	9820.59	9805.22	511.306	511.539	9867.13	9814.73
2019.	0.925	9884.43	9890.25	511.302	511.528	9877.17	9902.87
2020.	0.950	9948.80	9934.30	511.301	511.534	9968.09	9982.25
2021.	0.975	10035.87	9988.61	511.302	511.532	9972.85	9996.37
2022.	1.000	10028.48	10015.77	511.307	511.521	10011.44	10025.11
2023.	1.025	10078.62	10072.13	511.307	511.535	10083.34	10128.86
2024.	1.050	10135.09	10111.59	511.315	511.536	10143.61	10152.73
2025.	1.075	10223.23	10193.59	511.301	511.536	10206.53	10259.43
2026.	1.100	10264.40	10255.10	511.309	511.558	10241.95	10233.61
2027.	1.125	10279.71	10290.98	511.297	511.536	10285.31	10304.75
2028.	1.150	10357.83	10319.17	511.297	511.542	10342.42	10340.32
2029.	1.175	10402.71	10388.38	511.300	511.547	10396.89	10393.44
2030.	1.200	10489.81	10446.32	511.297	511.531	10466.69	10479.71
2031.	1.225	10570.58	10527.34	511.309	511.540	10526.97	10536.26
2032.	1.250	10572.69	10561.19	511.312	511.548	10559.23	10571.85
2033.	1.275	10581.67	10595.04	511.305	511.524	10595.19	10604.52
2034.	1.300	10687.25	10641.20	511.307	511.532	10649.13	10651.33
2035.	1.325	10712.07	10725.84	511.301	511.544	10708.36	10723.02
2036.	1.350	10798.65	10801.25	511.296	511.519	10782.39	10800.57
2037.	1.375	10843.00	10833.06	511.295	511.533	10861.18	10839.60
2038.	1.400	10893.15	10873.09	511.293	511.541	10858.54	10869.36
2039.	1.425	10941.72	10912.60	511.298	511.532	10909.83	10918.15
2040.	1.450	10987.12	10969.04	511.297	511.537	10934.68	10925.95
2041.	1.475	11054.69	11041.92	511.303	511.540	11081.14	11089.94
2042.	1.500	11091.11	11134.31	511.297	511.512	11092.77	11110.93

SARL, WL/FIM
FAA Aircraft Hardening Test
Taken on 3/ 9/93 at 14:33:45 and Printed on 3/ 9/93 at 14:50:25
BURST DISK #10 @4 DEG ALPHA

TPN	Time sec	P1	P2	ATC1	PTC1	A1	A2
2043.	1.525	9277.96	10097.24	511.294	511.519	9763.00	9813.76
2044.	1.550	8940.23	9004.73	511.287	511.505	9006.65	9021.45
2045.	1.575	8852.81	8813.49	511.285	511.481	8762.87	8789.42
2046.	1.600	8743.83	8717.89	511.288	511.541	8701.69	8751.48
2047.	1.625	8603.83	8582.44	511.286	511.591	8564.58	8588.06
2048.	1.650	7734.02	8013.93	511.294	511.601	7835.54	7864.02
2049.	1.675	6467.23	6718.60	511.286	511.589	6486.65	6539.20
2050.	1.700	6277.44	6299.46	511.287	511.512	6175.85	6274.73
2051.	1.725	6004.17	6045.44	511.283	511.439	5990.41	6019.50
2052.	1.750	5852.20	5851.04	511.275	511.356	5829.65	5857.61
2053.	1.775	5715.93	5756.91	511.261	511.327	5701.40	5737.04
2054.	1.800	5219.72	5330.65	511.265	511.311	5242.52	5261.11
2055.	1.825	4750.43	4843.05	511.266	511.292	4760.89	4773.56
2056.	1.850	4536.70	4578.23	511.280	511.269	4617.63	4570.88
2057.	1.875	4331.32	4366.80	511.275	511.206	4341.06	4354.62
2058.	1.900	4236.45	4197.07	511.278	511.168	4188.39	4210.30
2059.	1.925	4096.22	4047.16	511.278	511.138	4071.79	4081.05
2060.	1.950	3842.83	3889.64	511.271	511.117	3855.81	3868.26
2061.	1.975	3570.58	3628.46	511.262	511.124	3607.85	3621.51
2062.	2.000	3422.93	3493.80	511.265	511.106	3454.00	3473.88
2063.	2.025	3295.59	3334.76	511.262	511.072	3316.85	3326.28
2064.	2.050	3201.63	3210.76	511.273	511.080	3174.93	3211.71
2065.	2.075	3113.38	3078.64	511.273	511.094	3098.46	3090.86
2066.	2.100	2928.45	2973.95	511.282	511.039	2969.03	2983.12
2067.	2.125	2853.71	2864.68	511.270	510.977	2845.31	2850.66
2068.	2.150	2748.63	2714.22	511.275	510.984	2744.09	2745.88
2069.	2.175	2646.64	2659.83	511.269	510.989	2626.03	2631.42
2070.	2.200	2584.90	2523.09	511.266	511.016	2569.34	2580.99
2071.	2.225	2503.25	2500.21	511.264	511.031	2488.48	2510.69
2072.	2.250	2414.23	2428.52	511.262	511.035	2418.10	2421.00
2073.	2.275	2370.76	2376.15	511.273	511.066	2345.06	2363.81
2074.	2.300	2318.89	2300.90	511.281	511.086	2269.36	2258.16
2075.	2.325	2270.16	2259.20	511.274	511.065	2206.26	2250.89
2076.	2.350	2193.62	2196.14	511.279	511.050	2140.50	2192.27
2077.	2.375	2114.95	2165.63	511.273	511.044	2125.24	2147.70
2078.	2.400	2104.45	2101.54	511.255	511.016	2083.67	2076.49
2079.	2.425	2049.88	2074.08	511.259	511.039	2068.40	2086.67
2080.	2.450	2053.56	2014.06	511.261	511.080	2036.82	2076.49
2081.	2.475	2015.77	2010.49	511.259	511.080	1999.96	2015.96
2082.	2.500	1975.87	1959.62	511.276	511.104	1970.99	1990.29
2083.	2.525	1971.14	1930.12	511.271	511.134	1949.39	1994.17
2084.	2.550	1977.97	1965.22	511.271	511.137	1944.65	1964.14
2085.	2.575	1938.58	1927.57	511.272	511.142	1926.74	1949.13
2086.	2.600	1932.28	1923.50	511.258	511.151	1962.56	1929.77
2087.	2.625	1881.33	1938.26	511.257	511.149	1912.52	1928.32
2088.	2.650	1904.44	1895.52	511.260	511.160	1896.18	1916.21
2089.	2.675	1897.09	1872.63	511.269	511.191	1889.86	1938.97
2090.	2.700	1904.97	1835.49	511.270	511.191	1884.59	1895.88
2091.	2.725	1935.96	1901.63	511.268	511.196	1879.84	1896.85
2092.	2.750	1905.49	1894.00	511.269	511.236	1869.30	1878.94
2093.	2.775	1880.80	1881.28	511.266	511.232	1880.90	1895.88
2094.	2.800	1889.21	1909.77	511.262	511.224	1868.25	1910.89
2095.	2.825	1899.72	1866.01	511.261	511.241	1865.09	1889.10
2096.	2.850	1882.38	1831.92	511.260	511.240	1875.10	1892.97
2097.	2.875	1906.54	1885.35	511.257	511.234	1877.21	1895.88
2098.	2.900	1887.11	1884.84	511.263	511.265	1853.49	1848.44
2099.	2.925	1858.73	1882.30	511.263	511.272	1875.10	1895.88
2100.	2.950	1839.73	1877.72	511.263	511.261	1818.17	1892.01
2101.	2.975	1878.18	1828.87	511.265	511.302	1861.92	1870.22
2102.	3.000	1907.07	1872.63	511.261	511.300	1868.77	1887.17
2103.	3.025	1885.01	1865.00	511.256	511.297	1862.45	1882.81

SARL, WL/FIM
FAA Aircraft Hardening Test
Taken on 3/ 9/93 at 14:33:45 and Printed on 3/ 9/93 at 14:50:33
BURST DISK #10 @4 DEG ALPHA

TPN	Time sec	P1	P2	ATC1	PTC1	A1	A2
2104.	3.050	1870.82	1871.10	511.255	511.321	1868.77	1885.71
2105.	3.075	1885.01	1893.49	511.255	511.315	1877.21	1900.24
2106.	3.100	1882.38	1868.05	511.257	511.317	1857.18	1880.87
2107.	3.125	1886.06	1870.08	511.262	511.334	1864.03	1882.81
2108.	3.150	1880.80	1870.08	511.265	511.334	1865.09	1879.42
2109.	3.175	1844.02	1870.59	511.266	511.327	1858.76	1880.87
2110.	3.200	1869.77	1935.71	511.266	511.349	1861.92	1895.88
2111.	3.225	1875.02	1933.68	511.254	511.340	1872.99	1903.63
2112.	3.250	1871.34	1864.49	511.256	511.344	1845.05	1844.08
2113.	3.275	1879.23	1871.10	511.255	511.367	1859.29	1875.55
2114.	3.300	1870.82	1861.44	511.259	511.367	1847.16	1839.24
2115.	3.325	1892.89	1874.66	511.261	511.381	1859.81	1887.65
2116.	3.350	1894.99	1898.58	511.262	511.393	1868.25	1884.75
2117.	3.375	1850.85	1875.17	511.262	511.381	1862.98	1883.29
2118.	3.400	1878.70	1823.78	511.263	511.374	1853.49	1861.99
2119.	3.425	1897.09	1871.10	511.262	511.379	1861.92	1885.23
2120.	3.450	1931.23	1869.58	511.255	511.360	1859.29	1879.90
2121.	3.475	1891.31	1869.58	511.251	511.362	1865.61	1886.68
2122.	3.500	1858.21	1873.65	511.254	511.391	1850.33	1873.61
2123.	3.525	1869.24	1860.42	511.250	511.386	1873.52	1885.23
2124.	3.550	1851.90	1850.24	511.258	511.392	1861.40	1876.52
2125.	3.575	1873.45	1816.15	511.260	511.413	1855.07	1860.06
2126.	3.600	1831.93	1871.10	511.257	511.399	1846.64	1868.29
2127.	3.625	1865.57	1927.07	511.260	511.393	1858.23	1891.52
2128.	3.650	1871.87	1857.36	511.255	511.388	1851.38	1873.61
2129.	3.675	1882.90	1873.14	511.247	511.374	1867.72	1881.84
2130.	3.700	1861.89	1864.49	511.247	511.366	1851.91	1868.29
2131.	3.725	1826.68	1861.94	511.252	511.391	1859.29	1882.81
2132.	3.750	1881.33	1858.38	511.247	511.383	1824.49	1876.52
2133.	3.775	1882.38	1867.03	511.253	511.382	1866.14	1885.23
2134.	3.800	1875.02	1861.44	511.255	511.410	1842.42	1868.29
2135.	3.825	1814.06	1864.49	511.260	511.420	1859.81	1877.97
2136.	3.850	1861.36	1853.29	511.253	511.405	1835.57	1856.19
2137.	3.875	1848.22	1841.08	511.250	511.432	1829.77	1842.15
2138.	3.900	1799.87	1837.52	511.247	511.407	1799.71	1828.60
2139.	3.925	1798.29	1786.64	511.243	511.394	1780.20	1798.59
2140.	3.950	1820.90	1774.94	511.249	511.413	1768.60	1787.46
2141.	3.975	1772.53	1773.41	511.247	511.405	1757.52	1772.45
2142.	4.000	1765.17	1757.12	511.251	511.396	1696.32	1768.58
2143.	4.025	1753.08	1751.53	511.251	511.407	1743.28	1759.39
2144.	4.050	1751.50	1746.95	511.252	511.403	1764.38	1803.91
2145.	4.075	1749.92	1740.84	511.241	511.403	1759.10	1750.68
2146.	4.100	1740.45	1730.66	511.243	511.419	1725.87	1747.78
2147.	4.125	1712.05	1727.10	511.237	511.398	1715.84	1742.94
2148.	4.150	1742.56	1729.14	511.250	511.410	1722.70	1739.07
2149.	4.175	1737.83	1730.66	511.249	511.424	1705.29	1698.42
2150.	4.200	1734.14	1675.70	511.247	511.419	1711.09	1706.16
2151.	4.225	1716.26	1726.08	511.243	511.401	1712.68	1734.71
2152.	4.250	1748.87	1719.98	511.249	511.412	1715.84	1726.97
2153.	4.275	1731.51	1689.95	511.240	511.390	1708.46	1714.87
2154.	4.300	1754.65	1726.59	511.229	511.367	1719.01	1741.48
2155.	4.325	1724.68	1717.43	511.240	511.395	1713.20	1731.81
2156.	4.350	1707.84	1697.58	511.242	511.382	1707.40	1727.94
2157.	4.375	1725.20	1691.48	511.242	511.387	1716.37	1756.49
2158.	4.400	1756.23	1718.96	511.238	511.395	1714.26	1730.84
2159.	4.425	1739.40	1724.56	511.247	511.399	1712.15	1739.07
2160.	4.450	1747.29	1723.54	511.236	511.389	1712.68	1730.36
2161.	4.475	1735.72	1727.10	511.242	511.408	1728.51	1770.52
2162.	4.500	1730.99	1722.52	511.221	511.369	1691.57	1736.16
2163.	4.525	1735.72	1713.87	511.236	511.373	1711.09	1712.45
2164.	4.550	1731.51	1755.60	511.239	511.381	1719.54	1764.23

SARL, WL/FIM
FAA Aircraft ...dening Test
Taken on 3/ 9/93 at 14:33:45 and Printed on 3/ 9/93 at 14:50:38
BURST DISK #10 @4 DEG ALPHA

TPN	Time sec	P1	P2	ATC1	PTC1	A1	A2
2165.	4.575	1718.37	1722.52	511.232	511.359	1710.04	1731.32
2166.	4.600	1721.52	1724.56	511.237	511.355	1714.26	1731.32
2167.	4.625	1732.04	1720.99	511.239	511.379	1689.46	1694.07
2168.	4.650	1728.88	1700.13	511.241	511.357	1713.73	1741.00
2169.	4.675	1748.34	1720.99	511.231	511.354	1721.12	1733.26
2170.	4.700	1710.47	1745.93	511.225	511.374	1711.62	1739.07
2171.	4.725	1729.94	1727.61	511.224	511.367	1710.57	1734.71
2172.	4.750	1769.90	1720.99	511.231	511.374	1716.37	1732.29
2173.	4.775	1726.25	1789.69	511.226	511.388	1719.54	1755.52
2174.	4.800	1699.95	1703.69	511.238	511.388	1713.73	1730.36
2175.	4.825	1726.78	1707.25	511.234	511.379	1716.90	1770.52
2176.	4.850	1736.25	1723.54	511.235	511.402	1682.60	1716.32
2177.	4.875	1732.04	1716.92	511.229	511.384	1687.35	1726.00
2178.	4.900	1727.31	1718.96	511.233	511.370	1700.01	1711.97
2179.	4.925	1737.30	1718.45	511.220	511.367	1716.37	1740.52
2180.	4.950	1738.88	1728.12	511.217	511.345	1709.51	1734.71
2181.	4.975	1702.06	1762.72	511.216	511.338	1716.37	1737.13

SARL, WL/FIM
FAA Aircraft Hardening Test
Taken on 3/10/93 at 15:01:09 and Printed on 3/22/93 at 10:11:50
BURST DISK #12 @ 4DEG ALPHA

TPN		2392.	2393.	2394.	2395.	2396.	2397.	2398.	2399.	2400.	2401.
MACH		0.311	0.309	0.310	0.309	0.312	0.316	0.315	0.315	0.312	0.312
Q	psf	128.39	127.54	127.72	127.22	129.36	132.74	131.64	132.05	129.28	129.76
PSTS	psfa	1901.50	1902.60	1901.89	1903.34	1903.29	1899.59	1898.73	1897.32	1901.23	1901.39
TOIN	deg R	501.08	501.14	501.09	501.15	501.14	501.15	501.12	501.15	501.13	501.10
Alpha	deg	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Beta	deg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time	sec	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225
H2401		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2402		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2403		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2405		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2407		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2409		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2411		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2412		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2413		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2414		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2422		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2423		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2424		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2425		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2427		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2429		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2431		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2433		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2434		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2435		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2601		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2602		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2603		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2605		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2607		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2609		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2611		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2612		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2613		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2614		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2622		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2623		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2624		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2625		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653

SARL, WL/FIM
FAA Aircraft Hardening Test
Taken on 3/10/93 at 15:01:09 and Printed on 3/22/93 at 10:11:50
BURST DISK #12 @ 4DEG ALPHA

TPN		2392.	2393.	2394.	2395.	2396.	2397.	2398.	2399.	2400.	2401.
MACH		0.311	0.309	0.310	0.309	0.312	0.316	0.315	0.315	0.312	0.312
Alpha	deg	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Beta	deg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Q	psf	128.39	127.54	127.72	127.22	129.36	132.74	131.64	132.05	129.28	129.76
PSTS	psfa	1901.50	1902.60	1901.89	1903.34	1903.29	1899.59	1898.73	1897.32	1901.23	1901.39
TOIN	deg R	501.08	501.14	501.09	501.15	501.14	501.15	501.12	501.15	501.13	501.10
H2703		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2705		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2707		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2709		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2711		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2712		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2713		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2714		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2722		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2723		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2724		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2725		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2727		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2729		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2731		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2733		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2734		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2735		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2801		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2802		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2803		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2805		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2807		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2809		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2811		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2812		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2813		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2814		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2822		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2823		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2824		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2825		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2827		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653
H2829		-14.811	-14.918	-14.891	-14.961	-14.713	-14.310	-14.424	-14.369	-14.707	-14.653

Trisonic Gasdynamics Facility
WL, WPAFB
Taken on 3/15/93 at 11:51:47 and Printed on 3/16/93 at 14:50:39
Nozz Dia. = 1/8 Posit. 1A @-60 deg. Short Boom

TPN		1751.	1752.	1753.	1754.	1755.	1756.	1757.	1758.	1759.	1760.
Supply	psia	129.60	129.91	129.78	129.89	130.00	129.78	129.67	129.67	130.00	129.89
Anozz	aera	.000085	.000085	.000085	.000085	.000085	.000085	.000085	.000085	.000085	.000085
MACH		0.411	0.406	0.406	0.404	0.401	0.406	0.406	0.404	0.402	0.401
RN		0.13510E+07	0.13043E+07	0.12783E+07	0.12675E+07	0.12385E+07	0.13337E+07	0.13092E+07	0.12688E+07	0.12413E+07	0.12177E+07
P0	psfa	1013.13	1008.32	1003.90	1006.10	1011.02	1010.84	1010.42	1004.40	1007.96	1006.44
Q	psf	106.66	103.71	103.59	102.85	101.95	104.23	103.89	102.43	102.02	101.18
Right_Cm		0.0082	0.0085	0.0084	0.0085	0.0086	0.0084	0.0084	0.0085	0.0086	0.0086
Cq		0.0361	0.0371	0.0372	0.0375	0.0377	0.0366	0.0368	0.0375	0.0378	0.0380
Mdot	Lbm/sec	0.0187	0.0188	0.0187	0.0187	0.0187	0.0188	0.0187	0.0187	0.0187	0.0186
Alpha	deg	30.21	30.20	30.21	30.22	30.21	30.24	30.26	30.25	30.26	30.26
Beta	deg	0.01	0.01	3.03	3.04	3.04	6.09	9.10	9.10	12.15	12.15
CNB		0.1485	0.1495	0.1529	0.1546	0.1550	0.1589	0.1637	0.1638	0.1661	0.1668
CPMB		0.2087	0.2102	0.2158	0.2183	0.2189	0.2251	0.2319	0.2323	0.2359	0.2368
CYB		0.0341	0.0346	0.0249	0.0251	0.0251	0.0165	0.0087	0.0088	0.0008	0.0005
CYMB		0.0249	0.0252	0.0193	0.0195	0.0196	0.0140	0.0090	0.0091	0.0040	0.0038
CRMB		0.0014	0.0014	0.0012	0.0012	0.0013	0.0009	0.0006	0.0006	0.0001	0.0002
CAB		-0.0123	-0.0172	-0.0195	-0.0202	-0.0214	-0.0144	-0.0203	-0.0227	-0.0226	-0.0238
N1	volts	-0.000248	-0.000234	-0.000100	-0.000100	-0.000100	0.000028	0.000165	0.000167	0.000295	0.000295
N2	volts	0.000963	0.000954	0.000927	0.000926	0.000929	0.000887	0.000830	0.000828	0.000778	0.000781
Y1	volts	0.001279	0.001279	0.001367	0.001388	0.001384	0.001444	0.001534	0.001528	0.001539	0.001526
Y2	volts	0.000003	-0.000069	-0.000138	-0.000146	-0.000164	-0.000112	-0.000163	-0.000205	-0.000237	-0.000238
Roll	volts	-0.000342	-0.000340	-0.000292	-0.000293	-0.000290	-0.000275	-0.000280	-0.000280	-0.000293	-0.000286
Axial	volts	-0.000135	-0.000184	-0.000256	-0.000262	-0.000274	-0.000251	-0.000361	-0.000384	-0.000428	-0.000440
NF_T	lbs	17.10	16.74	17.11	17.17	17.06	17.89	18.37	18.12	18.30	18.23
PM_T	in-lb	195.89	191.90	196.80	197.60	196.39	206.47	212.10	209.44	211.83	210.86
SF_T	lbs	3.93	3.88	2.78	2.79	2.77	1.85	0.97	0.97	0.08	0.05
YM_T	in-lb	61.93	60.98	46.70	46.73	46.55	34.14	21.73	21.67	9.41	9.05
RM_T	in-lb	3.45	3.42	2.97	2.96	2.98	2.28	1.37	1.37	0.34	0.39
AF_T	lbs	-1.42	-1.93	-2.18	-2.24	-2.36	-1.62	-2.28	-2.51	-2.49	-2.61
w		10.74	10.74	10.74	10.74	10.74	10.74	10.74	10.74	10.74	10.74
aw		2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
bw		3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
trdld		Roll	Roll	Roll	Roll	Roll	Roll	Roll	Roll	Roll	Roll
trdlb		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
trdla		Down	Down	Down	Down	Down	Down	Down	Down	Down	Down

Trisonic Gasdynamics Facility
WL, WPAFB
Taken on 3/15/93 at 14:55:53 and Printed on 3/16/93 at 14:50:42
Nozz Dia. = 1/8 Posit. 1A @-60 deg. Short Boom

TPN		1761.	1762.	1763.	1764.	1765.	1766.	1767.	1768.	1769.	1770.
Supply	psia	130.08	129.64	184.09	185.15	185.17	185.40	185.94	185.96	185.34	357.79
Anozz	aera	.000085	.000085	.000085	.000085	.000085	.000085	.000085	.000085	.000085	.000085
MACH		0.401	0.405	0.410	0.406	0.405	0.402	0.402	0.402	0.404	0.401
RN		0.12271E+07	0.13260E+07	0.12615E+07	0.12925E+07	0.12677E+07	0.12478E+07	0.12141E+07	0.12114E+07	0.12328E+07	0.12065E+07
F0	psfa	1000.08	1010.64	997.95	1005.83	1004.62	1012.18	1000.84	1012.49	995.73	1012.22
Q	psf	100.73	103.81	104.81	103.80	102.80	102.22	101.12	102.68	101.48	101.96
Right_Cm		0.0087	0.0084	0.0119	0.0120	0.0121	0.0122	0.0124	0.0122	0.0123	0.0251
Cq		0.0383	0.0368	0.0535	0.0534	0.0538	0.0541	0.0552	0.0548	0.0551	0.1184
Mdot	Lbm/sec	0.0188	0.0188	0.0268	0.0269	0.0269	0.0269	0.0269	0.0270	0.0270	0.0580
Alpha	deg	30.27	30.32	30.23	30.25	30.27	30.28	30.29	30.31	30.33	30.28
Beta	deg	15.15	18.18	-0.04	2.98	6.04	9.06	12.12	15.11	18.15	-0.16
CNB		0.1727	0.1763	0.1540	0.1593	0.1664	0.1699	0.1777	0.1776	0.1810	0.1677
CPMB		0.2445	0.2510	0.2182	0.2266	0.2377	0.2428	0.2529	0.2533	0.2595	0.2401
CYB		-0.0110	-0.0170	0.0439	0.0340	0.0259	0.0176	0.0035	-0.0046	-0.0125	0.0702
CYMB		-0.0024	-0.0067	0.0319	0.0260	0.0209	0.0155	0.0079	0.0025	-0.0024	0.0505
CRMB		-0.0002	-0.0007	0.0015	0.0013	0.0010	0.0006	0.0003	-0.0002	-0.0006	0.0017
CAB		-0.0214	-0.0214	-0.0178	-0.0215	-0.0231	-0.0255	-0.0273	-0.0265	-0.0243	-0.0313
N1	volts	0.000387	0.000511	-0.000468	-0.000325	-0.000191	-0.000050	0.000071	0.000204	0.000320	-0.001030
N2	volts	0.000802	0.000732	0.001083	0.001052	0.001007	0.000951	0.000976	0.000920	0.000872	0.001376
Y1	volts	0.001500	0.001712	0.001507	0.001624	0.001765	0.001797	0.001781	0.001817	0.001871	0.001963
Y2	volts	-0.000154	-0.000224	-0.000160	-0.000245	-0.000319	-0.000349	-0.000257	-0.000288	-0.000367	-0.000415
Roll	volts	-0.000249	-0.000295	-0.000410	-0.000365	-0.000347	-0.000346	-0.000290	-0.000307	-0.000320	-0.000588
Axial	volts	-0.000459	-0.000511	-0.000191	-0.000277	-0.000340	-0.000411	-0.000476	-0.000516	-0.000536	-0.000324
NF_T	lbs	18.78	19.76	17.43	17.86	18.47	18.75	19.41	19.69	19.84	18.46
PM_T	in-lb	216.83	229.39	201.29	207.05	215.07	218.49	225.09	228.93	231.79	215.48
SF_T	lbs	-1.20	-1.91	4.97	3.81	2.87	1.94	0.39	-0.51	-1.37	7.73
YM_T	in-lb	-5.63	-16.19	78.03	62.90	50.08	37.02	18.60	6.04	-5.72	120.21
RM_T	in-lb	-0.40	-1.68	3.59	3.06	2.38	1.48	0.64	-0.45	-1.48	4.03
AF_T	lbs	-2.33	-2.40	-2.02	-2.41	-2.57	-2.82	-2.99	-2.94	-2.67	-3.45
w		10.74	10.74	10.74	10.74	10.74	10.74	10.74	10.74	10.74	10.74
aw		2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
bw		3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
trdld		Roll	Roll	Roll	Roll	Roll	Roll	Roll	Roll	Roll	Roll
trdlb		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
trdla		Down	Down	Down	Down	Down	Down	Down	Down	Down	Down

Trisonic Gasdynamics Facility
WL, WPAFB
Taken on 3/15/93 at 15:05:08 and Printed on 3/16/93 at 14:50:45
Nozz Dia. = 1/8 Posit. 1A @-60 deg. Short Boom

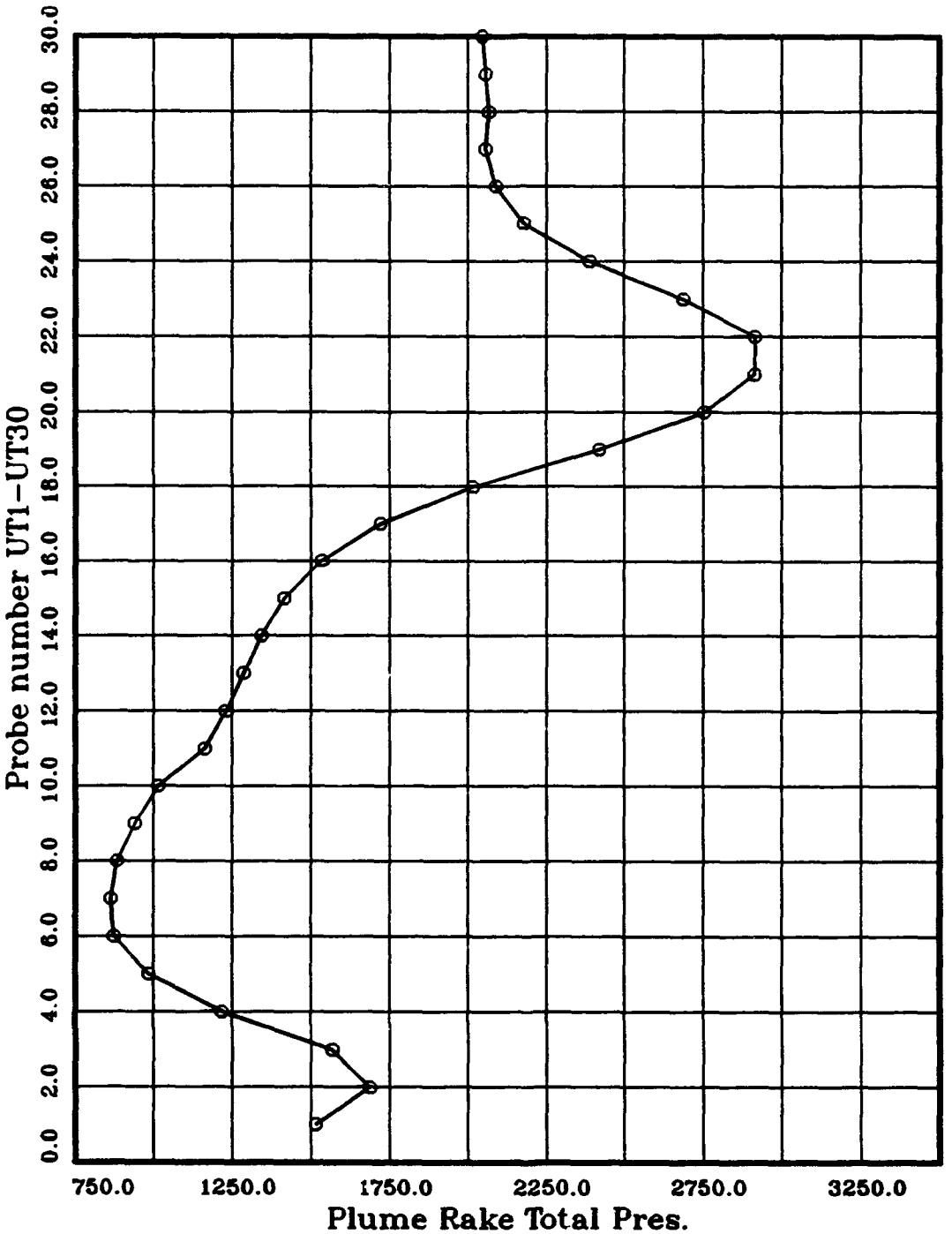
TPN		1771.	1772.	1773.	1774.	1775.	1776.
Supply	psia	356.00	356.66	356.32	355.16	354.72	353.81
Anozz	aera	.000085	.000085	.000085	.000085	.000085	.000085
MACH		0.408	0.401	0.406	0.410	0.407	0.404
RN		0.13101E+07	0.12050E+07	0.12431E+07	0.13466E+07	0.12840E+07	0.12630E+07
P0	psfa	1007.76	1012.65	995.96	1017.33	1002.21	1012.72
Q	psf	104.77	101.97	102.50	106.64	103.57	103.32
Right_Cm		0.0243	0.0251	0.0249	0.0238	0.0245	0.0244
Cq		0.1126	0.1159	0.1176	0.1098	0.1086	0.1140
Mdot	Lbm/sec	0.0573	0.0568	0.0581	0.0570	0.0546	0.0571
Alpha	deg	30.32	30.36	30.36	30.39	30.40	30.41
Beta	deg	2.85	8.93	8.93	12.00	15.00	18.05
CNB		0.1728	0.1860	0.1852	0.1895	0.1935	0.1935
CPMB		0.2497	0.2708	0.2691	0.2748	0.2814	0.2829
CYB		0.0599	0.0427	0.0425	0.0262	0.0163	0.0046
CYMB		0.0441	0.0335	0.0332	0.0240	0.0180	0.0111
CRMB		0.0014	0.0008	0.0007	0.0003	-0.0002	-0.0006
CAB		-0.0242	-0.0345	-0.0288	-0.0286	-0.0342	-0.0360
N1	volts	-0.000906	-0.000623	-0.000618	-0.000495	-0.000338	-0.000194
N2	volts	0.001346	0.001257	0.001251	0.001289	0.001237	0.001205
Y1	volts	0.002208	0.002505	0.002427	0.002571	0.002597	0.002675
Y2	volts	-0.000495	-0.000712	-0.000633	-0.000565	-0.000678	-0.000819
Roll	volts	-0.000573	-0.000535	-0.000542	-0.000486	-0.000482	-0.000465
Axial	volts	-0.000303	-0.000501	-0.000442	-0.000500	-0.000597	-0.000662
NF_T	lbs	19.55	20.49	20.50	21.82	21.65	21.59
PM_T	in-lb	230.31	243.00	242.77	257.92	256.51	257.22
SF_T	lbs	6.78	4.70	4.70	3.02	1.82	0.52
YM_T	in-lb	107.68	79.59	79.43	59.74	43.60	26.83
RM_T	in-lb	3.32	1.80	1.71	0.74	-0.37	-1.44
AF_T	lbs	-2.74	-3.80	-3.19	-3.29	-3.82	-4.02
w		10.74	10.74	10.74	10.74	10.74	10.74
aw		2.25	2.25	2.25	2.25	2.25	2.25
bw		3.92	3.92	3.92	3.92	3.92	3.92
trdld		Roll	Roll	Roll	Roll	Roll	Roll
trdlb		0.	0.	0.	0.	0.	0.
trdla		Down	Down	Down	Down	Down	Down

FAA CAHP Test

o = Run no 130., Mach 0.495
Alpha = 0.000
PLUME RAKE FWD

Configuration 4014
Beta = 0.000

TPN = 959.

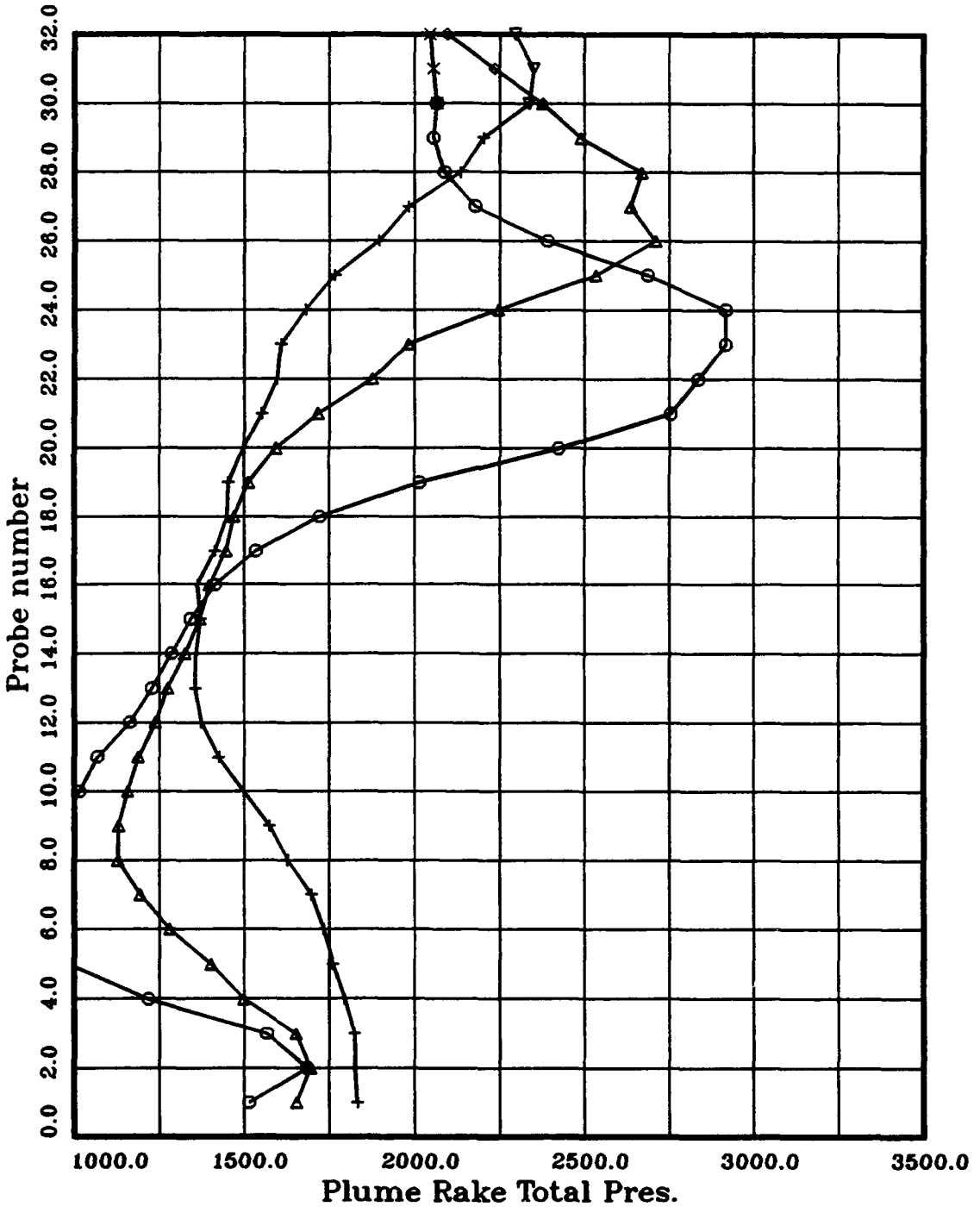


FAA CAHP Test

Mach 0.495
Alpha = 0.000
PLUME RAKE FWD

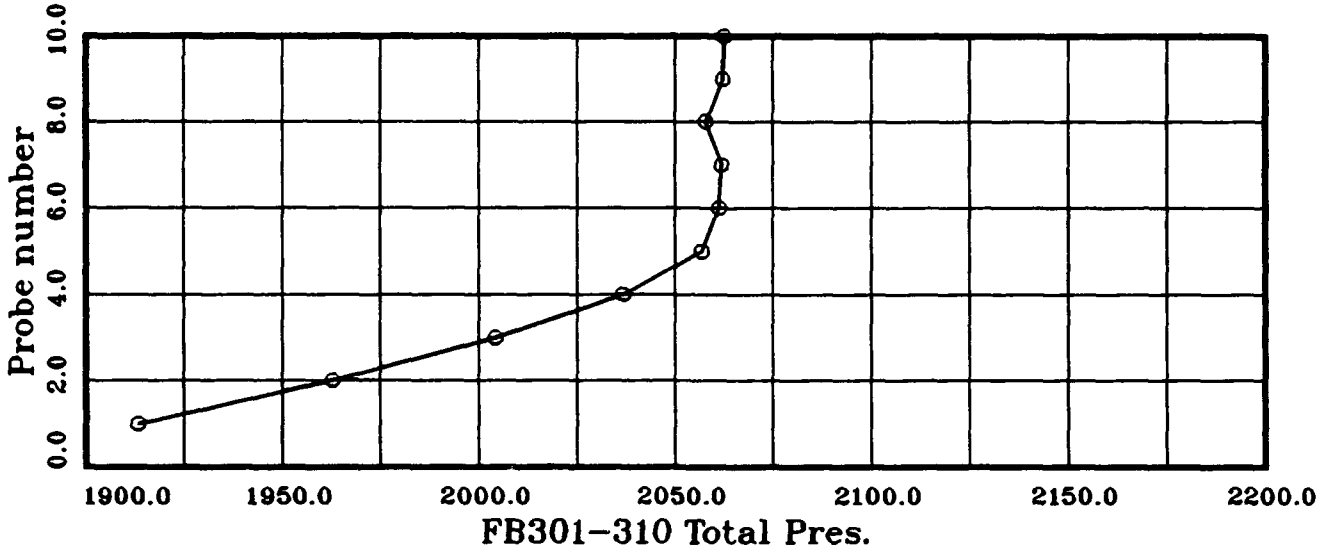
Configuration 4014
Beta = 0.000

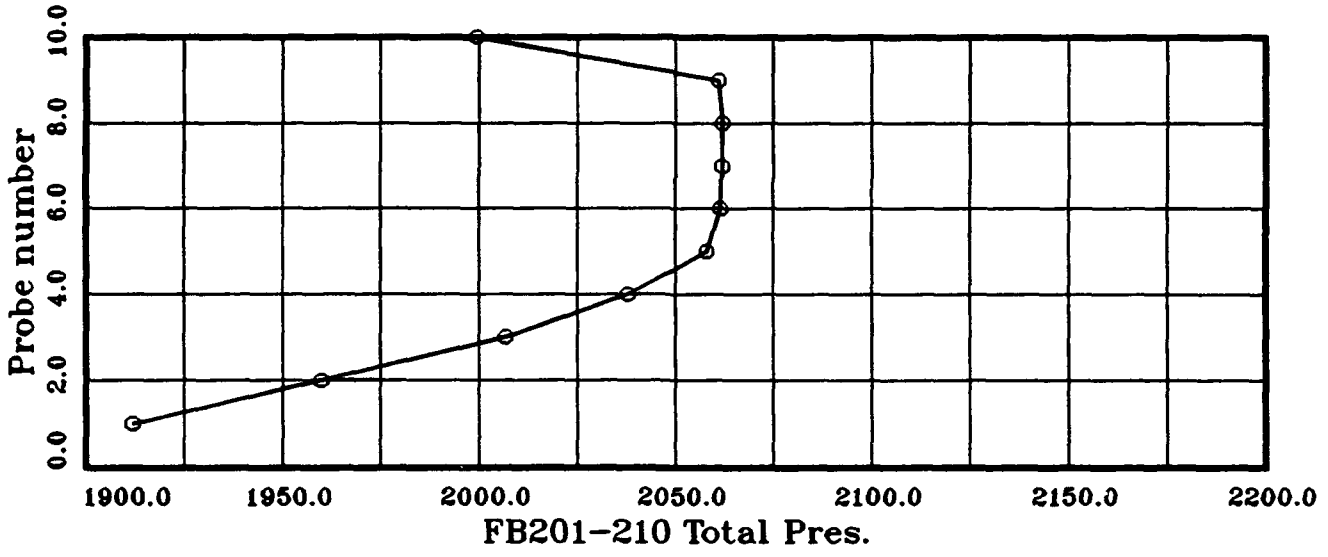
O = TPN = 959.
Δ = TPN = 960.
+ = TPN = 961.

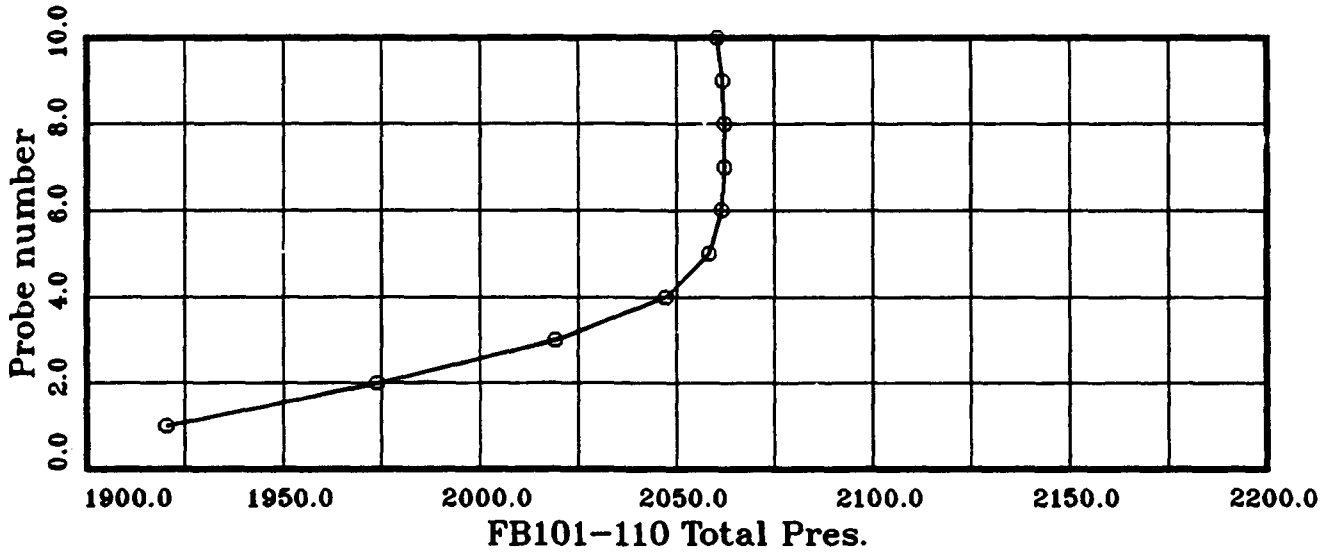


FAA

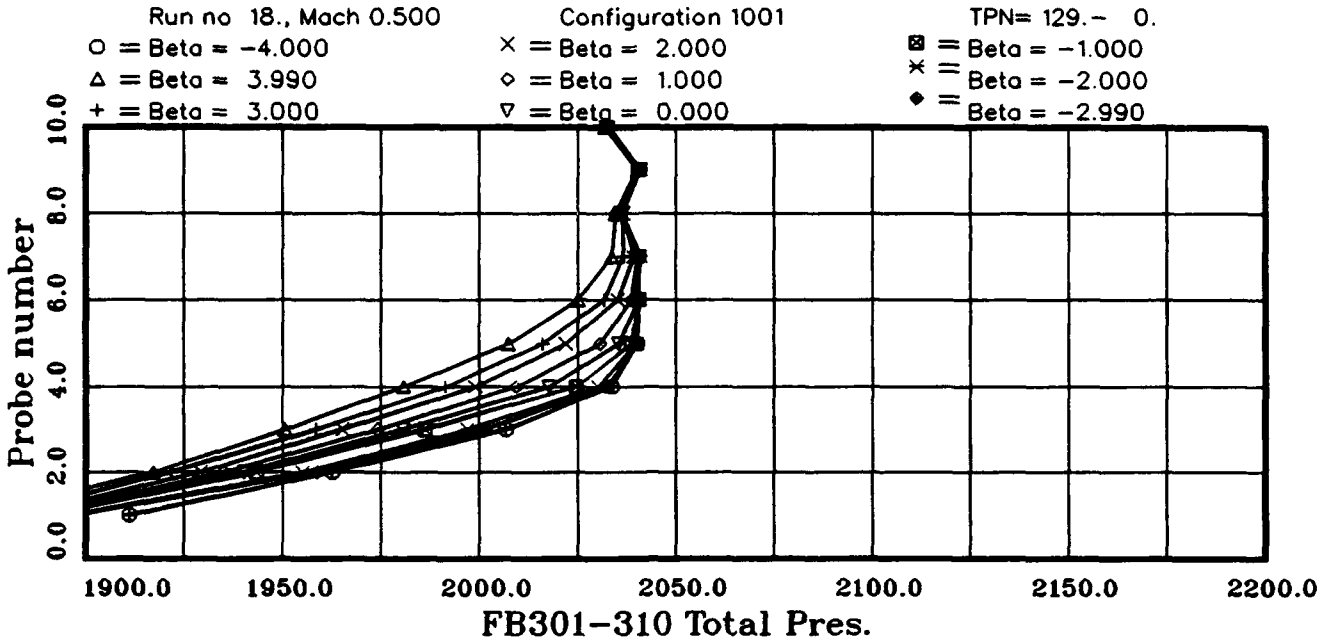
O = Run no 16., Mach 0.491 Configuration 1001 TPN = 114.
Alpha = 0.000 Beta = 0.000

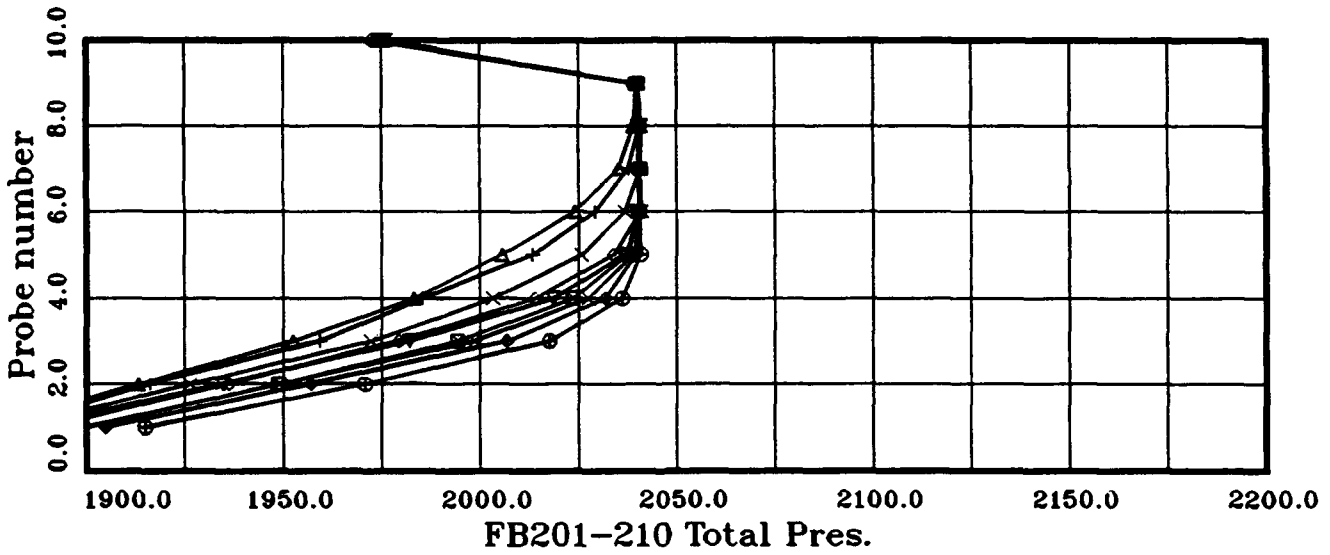


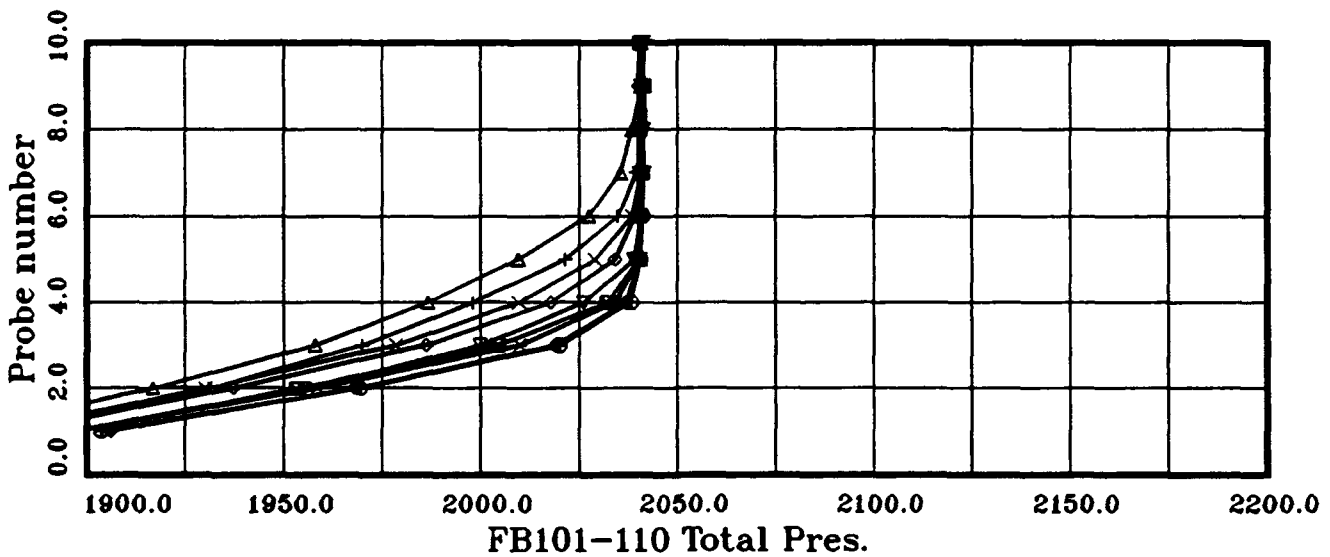




FAA


Run no 18., Mach 0.500
Configuration 1001
TPN= 129.- 0.
○ = Beta = -4.000
△ = Beta = 3.990
+ = Beta = 3.000
× = Beta = 2.000
◇ = Beta = 1.000
▽ = Beta = 0.000
⊠ = Beta = -1.000
✕ = Beta = -2.000
◆ = Beta = -2.990
Probe number
0.0
2.0
4.0
6.0
8.0
10.0
1900.0
1950.0
2000.0
2050.0
2100.0
2150.0
2200.0
FB301-310 Total Pres.


Probe number
0.0
2.0
4.0
6.0
8.0
10.0
1900.0
1950.0
2000.0
2050.0
2100.0
2150.0
2200.0
FB201-210 Total Pres.


Probe number
0.0
2.0
4.0
6.0
8.0
10.0
1900.0
1950.0
2000.0
2050.0
2100.0
2150.0
2200.0
FB101-110 Total Pres.

F-16 Forebody Blowing

+ = TPN=1626.-1738.	Mdot=0.0002	MACH= 0.402	Supply= 5.5 P0= 1009.
× = TPN=1751.-1762.	Mdot=0.0002	MACH= 0.402	Supply= 5.5 P0= 1009.
◇ = TPN=1763.-1769.	Mdot=0.0002	MACH= 0.402	Supply= 5.5 P0= 1009.
▽ = TPN=1770.-1776.	Mdot=0.0002	MACH= 0.402	Supply= 5.5 P0= 1009.